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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 9 NOVEMBER 1958 No. 11

SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Transient Geomagnetic Variations

By
Mary L. Rice

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ng to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, :., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a ecial subject (usually arranged chronologically). No attempt is made to prepare exhaustive bliographies; instead, the aim is to include a representative cross section of the various pects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm De-
Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	tect.

Vol. III, 1952

Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges	
Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics	
Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecasting (Suppl.)
Albedo 8. Meteors	9–10. Tropospheric Propagation	11. Medical Meteorology

Vol. IX, 1958

Radioastronomy	2. Solar Astrophysics	3. Radioactivity in Atmosphere	
Waves and Currents	5. Physical Oceanog.	6. Dynamic & Phys. Oceanog.	
Long Range Forecasting	8. Radar Met.	9. Cosmic Rays	10–11. Geomagnetism

Other bibliographies in preparation are:

Actinometers	*Micrometeorology*	*Severe Storms*
High Atmosphere Temperatures	*Ozone*	*Singularities*
Mesometeorology	*Radiation*	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important blications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue mprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where material may be found. The Union List of Serials (Gregory) is the source of most of symbols used. In some cases, where no symbol has been assigned to a library, one will devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by char

Geographic locations are in the English form rather than the form used locally, for examp Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwi stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to t Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months a abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numb (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vo 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART 1. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

9.11–1 551.510.535(08)

Polar Atmosphere Symposium, Oslo, July 2–8, 1956. **Proceedings, Pt. 2, Ionospheric ection.** *Journal of Atmospheric and Terrestrial Physics*, London, Special Supplement, 1957, sued **1958.** 212 p. figs. (incl. photos), tables, refs., eqs. **DLC**—All articles abstracted parately. Twenty-one papers on the polar ionosphere arranged according to the 3 sections the symposia, each section with an extensive discussion: I. Drifts in the ionosphere; II. Progstic techniques of the ionosphere with special reference to Arctic regions; and III. Absorption. he opening speech by FRANK L. WATTENDORF, director of AGARD of NATO gives the story of the Advisory Group for Aeronautical Research and Development—conceived by H. VON KÁRMÁN—and of the symposium in Oslo on July 2–8, 1956, where polar-ionospheric nd meteorological research would be discussed; followed by an introduction speech by the te H. U. SVERDRUP, who mentions his early interest in Arctic research, dating back to 1918 hen he departed on the "Maud," and on the great changes in Arctic observation techniques nce 1918–25 and, finally, on the difference in emphasis between Arctic and tropical meteorogy—in one case radiation processes and inversions are foremost; in the other, the convective rocesses and condensation are more prominent. (For listing of contents, *see* Pt. III, May 958, *MAB.*) *Subject Headings:* **1. Polar atmosphere symposium 2. Ionospheric symposia.** *-M.R.*

9.11–2 551.5(08) 551.5:92

†Brounov, Petr Ivanovich, **Izbrannye sochineniia.** [Collected works.] Leningrad, idrometizdat, **1957.** 2 vol. Vol. 1 (337 p.), **Agricultural meteorology.** p. 329–330, List scientific articles by Brounov on agricultural meteorology. Vol. 2 (300 p.), **Synoptic eteorology.** p. 295–298, List of works by Brounov. figs., tables, refs. in each vol. **DLC** QC852.B74)—In the first of these two elaborate volumes (1800 copies) there are reprinted of P. I. BROUNOV's works on synoptic meteorology published from 1879–1921, arranged chronological order, with over 100 refs. to his works published in Russian and foreign urnals (1878–1928). In Vol. 2, are reprinted 16 of his works on Agricultural meteorology om 1895–1924, with a bibliography of 47 of his works in this field from 1893–1928. Each olume contains a long summary of his work in each field and at the end, extensive annotations. ROUNOV was born on Dec. 21, 1852 in St. Petersburg and died on April 24, 1927 at the age of 74. is synoptic and climatological works dealt with climatic anomalies, cyclone and anticyclone acks forecasting cyclones or storms, structure of cyclones, general circulation, eddy structure earth's atmosphere (1897) thunderstorm eddies, pressure waves and their use in forecasting, c. and his agrometeorological works with observations and networks, research on crops and eather, drought control, etc. The works are remarkable for their quantitative nature and lvanced perspective based on a broad education in all branches of science and a scholarly proach (similar and parallel to that of CLEVELAND ABBE in the U. S.) *Subject Headings:* **Collected works of P. I. Brounov 2. Synoptic climatology 3. Synoptic meteorology Agricultural meteorology 5. Biography of P. I. Brounov 6. History of Russian Meteorogical Service 7. Brounov, P. I.**—*M.R.*

9.11–3 551.509.312:551.515.2

Vortex: Collected papers of the Numerical Weather Prediction Group in Tokyo, No. 2, sued June **1957.** Reprints of papers from **Meteorological Society of Japan, Journal,** and om **Papers in Meteorology and Geophysics,** Tokyo, **1956** and **1957** issues. All papers

abstracted separately from original sources. **DWB**—This is a collection of reprints of papers written in English by Japanese authors on various aspects of numerical predict from the solution of the basic equations of motion and balance equation, to pressure—w rotations, topographical effects, precipitation forecasting, vertical velocities in prediction typhoons, and typhoon movement prediction, extended forecasting by numerical metho and seasonal studies of the general circulation, heat sources of sinks, etc. (For listing papers in Vortex, No. 2, *see* Pt. III, p. 1046, Aug. 1958, *MAB.*) *Subject Headings:* **1. Numeri forecasting studies 2. Typhoon forecasting by numerical methods. I. Japan. Numeri Weather Prediction Group, Tokyo.**—*M.R.*

TEXTBOOKS

9.11–4 551.582.2:551.589(9

†*Garnier, Benjamin John, **The climate of New Zealand: a geographic survey.** Lond Edward Arnold, **1958.** 191 p. 70 figs., 50 tables, bibliog. p. 179–182, numerous refs. D (QC992.M9G28)—An elegant volume, full of large illustrative photographs, statistical grap maps, synoptic charts, tables, etc., treating the climate of New Zealand from a regional stan point but with emphasis on actual weather conditions in each section, and season attendi specific synoptic patterns modified by the rugged and varying topography. The statisti data supporting the text in each section is also quite extensive, and for the country as a wh is even more extensive (for about 50 stations for 1921–50). Nine regions are delineate Middle, Northern and Southern New Zealand; Western, Eastern, Inland and Upland Sou Island; and Eastern and Central North Island. The numerous synoptic charts are all f 1949 and 1950. *Subject Headings:* **1. Climate of New Zealand 2. Synoptic types 3. Region climatology 4. New Zealand.**—*M.R.*

9.11–5 51(0

Friedman, Bernard (*Res. Prof., N. Y. Univ.*), **Principles and techniques of applied mathe matics.** N. Y., John Wiley; London, Chapman & Hall, **1956.** 315 p. figs., 24 refs., ec **DWB** (510 F911pr)—An "introductory" textbook in applied mathematics, covering the mo recent as well as standard theoretical or "pure" mathematical developments which are spec fically related to solution of practical problems: 1) Linear spaces and functions (Vector an Hilbert space, convergence and operators); 2) Spectral theory of operators (eigen-value orthogonal matrices, etc.); 3) Green's functions (unmixed and non-homogeneous boundar conditions, discontinuity conditions, wave propagation and scattering, etc.; 4) Eigenvalu problems of Ordinary differential equations (continuous and discrete spectra, perturbation normalization, etc.); and 5) Partial differential equations (wave equations, etc.). *Subje Headings:* **1. Applied mathematics textbooks 2. Eigen values 3. Green's functions 4. Linea operators 5. Wave propagation theory.**—*M.R.*

9.11–6 551.574.1:01

†*Fuks, N. A., **Mekhanika aerozoleĭ.** [Mechanics of aerosols.] Moscow. Akademii Nauk SSSR, **1955.** 351 p. 39 figs., 37 tables, 581 refs., eqs. **DLC** (QD549.F9)—A majo monograph or text covering the world literature on theoretical, statistical and experimenta aspects of aerosols; classification, measurement, form, structure, laminar and turbulen motions of aerosol particles, electrical and acoustical effects, Brownian movements, magnet effects, electrostatic dispersion of aerosols, filters, gravity, centrifugal and electric precipitatio aerosol sampling devices, coagulation of aerosols, diffusion in convective and turbulent systen in laboratory and atmosphere, distribution and precipitation of aerosols in atmosphere (p. 242 258), molecular forces, transportation of particles by air currents, deformation of drops in a electric field and in falling, etc. Smoke, dust, sand, fog and cloud droplets are treated throug out. The excellent list of references is mainly to western literature. *Subject Heading* **1. Aerosol mechanics 2. Aerosol bibliographies 3. Bibliographies on aerosols.**—*M.R.*

9.11–7 532.5(02):551.51

†Kochin, N. E.; Kibel', I. A. and Roze, N. V., **Teoreticheskaia gidromekhanika, Vol.** [Theoretical hydromechanics, Vol. 1.] 5th ed. Moscow, Gosud. Izdat. Tekhniko-Teor

heskoĭ Literatury, **1955.** 560 p. 183 figs., bibliog. p. 552–556, numerous eqs. Price: roubles, 70 kopeks. **DLC.** Review by G. A. Bull in *Meteorological Magazine*, 85(1,013): 7–348, Nov. **1956. DWB**—The 5th edition of this classical theoretical text on hydro-chanics (fluid motion, hydrostatics, kinematics, motion of fluids over solid bodies or of id bodies through fluids, vorticity, atmospheric motions, etc.) contains about 25 more pages an the 4th edition (which was translated into German). The most important additions are nd in ch. 8. (Wave motion in an ideal fluid.) In section B (Plane waves) paragraph 20 . 477–486) there is a detailed mathematical solution of the general case and several special ses of flow of waves in an ideal, compressible baroclinic fluid over a mountain range of infinite ngth at a right angle to the flow (after A. DORODNITSYN, 1938 and 1950). The cases of an othermal atmosphere and of varying height of the tropopause are considered. In the same ., Sec. G (Long waves), a few additions have been made to Sec. 35 on waves in a rotating mospheric envelope (using work of CRAIG, BLINOVA and NEAMTAN, p. 542) in discussion of rticity in relation to formation of ridges and troughs, etc., and a new paragraph, No. 36, 543–550, on centers of action in the atmosphere, wherein ROSSBY's (1939) and BLINOVA's 953) theories as to the semi-permanent cyclonic and anticyclonic areas are set forth in eat detail, but entirely mathematically (no schematic diagrams or cross sections). Although . VIII was attributed to N. E. KOCHIN, the new paragraphs and the corrections, all of which e of meteorological interest or application, are by I. KIBEL'. (For abstract on rev. 4th ed., ub. **1948,** *see* 6.5–7, May 1955, *MAB*.) *Subject Headings:* **1. Theoretical hydromechanics Fluid mechanics 3. Air flow over obstacles 4. Centers of action. I. Dorodnitsyn, A. . Blinova, E. N. III. Kibel', I. A.** (*ed.*).—*M.R.*

9.11–8 532.5(02):551.511

†Kochin, N. E.; Kibel', I. A. and Roze, N. V., **Theoretische Hydromechanik, Vol. 1.** Theoretical hydromechanics, Vol. 1.] Berlin, Akademie Verlag, **1954.** 508 p. 179 figs., ot-refs., numerous eqs. Trans. by J. Sauer from their original Russian, **Teoreticheskaia idromekhanika,** 4th Rev. ed., pub. **1948** (*see* 6.5–7, May 1955, *MAB*). Review by T. V. avies in *Royal Meteorological Society, Quarterly Journal*, 81(350):647, Oct. **1955.** Review by . G. Sutton in *Meteorological Magazine*, 84(991):27, Jan. **1955.** (Vol. 2, pub. **1955,** not seen. or review, by T. V. Davies, *see R.M.S., Q.J.*, 82(353):378, July **1956.**) **DLC**—This German anslation of the 4th edition of KOCHIN, KIBEL' and ROZE's standard college text on hydro-d aerodynamics, is welcome to those who do not read Russian, but as is usually the case with anslations of popular texts, the 5th ed. of the Russian text is available as soon as the transla-on of the 4th edition is published. The book is useful for students of hydrology, meteorology, rodynamics, etc. in that it presents the mathematical solutions of all of the classical problems compressible and incompressible viscous and non-viscous flow in a straightforward and tailed manner. *Subject Headings:* **1. Theoretical hydromechanics 2. Fluid mechanics Vorticity theory 4. Kinematics 5. Translations. I. Kibel', I. A.** (*ed.*) **II. Sauer, J.** *rans.*).—*M.R.*

9.11–9 551.507.362.1:551.510.536(02)

Link, František and Neužil, Luděk, **Raketové lety a výzkum vysoké atmosféry.** [Rocket ght and exploration of the upper atmosphere.] Prague, Ceskoslovenská Akademie Věd, **57.** 235 p. 104 figs. (incl. photos), tables, 18 refs. **DLC** (TL782.L5)—As stated in the troduction to this book on the upper atmosphere, the use of rockets greatly facilitates upper mospheric research but does not replace other methods of exploration. Accordingly, the thors deal with all available methods of investigating the various properties of the upper mosphere. Upper atmospheric phenomena are discussed on the basis of results reported in ternational literature and of original work. The methods described include stratosphere ghts, acoustical sounding, photometric and other measurement during lunar eclipses (LINK ntributed considerably to the development of this method), rocket launchings (based upon rk in the U. S.), artificial satellites (based upon Project Vanguard), ionospheric sounding, ectroscopy (including rocket spectroscopy, etc.). The upper atmospheric phenomena scussed include as one, twilight phenomena, night sky luminescence, ionospheric phenomena, roras, meteors, geomagnetism, structure and composition of the atmosphere, etc. The formation is up to date and presented in a clear, nontechnical manner for the benefit of the

general public. *Subject Headings:* **1. Rocket exploration of the upper atmosphere 2. U atmosphere textbooks.**—*G.T.*

9.11–10 581.1:551.58

†*Sharapov, N. I., **Khimizm rastenii i klimat.** [Plant chemistry and climate.] Mosc Akademiia Nauk SSSR, **1954.** 207 p. 12 figs., 48 tables, bibliog. p. 187–204 (in 2 alphab Russian and non-Russian titles). **DLC** (S600.S53)—A book comprising a survey of the pres knowledge gained from hundreds of native and foreign articles on plant chemistry (ph synthesis, formation of carbohydrates, proteins and fats, etc.) and going into the effects solar radiation; water, CO_2, etc. on different crops or elements; geographical and clima effects; transpiration and assimilation, mineral utilization, soil effects, heat and light, humid alkalinity and acidity effects, etc. The purpose of the text is to promote the more effect utilization of climatic factors to increase crop production. The emphasis is on phys rather than on geographical influences. *Subject Headings:* **1. Plant chemistry and clim 2. Climatic effects on plant chemistry 3. Plant chemistry textbooks.**—*M.R.*

9.11–11 551.508.21(0

†Ianishevskii, Iurii Dmitrievich, **Aktinometricheskie pribory i metody nabliudenii.** [A tinometric instruments and methods of observation.] Leningrad, Gidrometizdat, 19 414 p. 93 figs., 45+21 tables, 75 refs., eqs. **DWB** (M08.21 I11ak)—A thorough treatise instrumental, observational and theoretical aspects of actinometry for use by geophysicis meteorologists and bioclimatologists working in the laboratory or at stations or on expeditio Ch. 1 takes up forms of radiation and their measurement; Ch. 2, astronomical aspects actinometry, 3) electrical equipment work in actinometry, 4) the galvanograph, 5) the co pensating pyrheliometer, 6) Mikhelson's bimetallic actinometer, 7) measurement of immedia radiation (direct and diffuse, visible and short wave), 8) long wave and infrared actinomet both at night and during the day, 9) observations at meteorological stations and networ Numerous schematic diagrams are included in the text and extensive tables and nomogra for calculation are appended. The bibliography contains about 30 refs. to western sour (10 of them since 1945) and 52 from Russian literature (30 from 1945–1957.) *Subject Headin* **1. Actinometry textbooks 2. Actinometric observations.**—*M.R.*

9.11–12 551.590.21:577(0

†Berg, Hellmut (*Cologne Univ.*), **Solar-terrestrische Beziehung in Meteorologie u Biologie.** [Solar terrestrial relationships in meteorology and biology.] Leipzig, Geest Portig, **1957.** 172 p. 77 figs., tables, 200 refs. (*Probleme der Kosmischen Physik*, Leipzi Vol. 30.) **DLC** (QC911 B543)—Various aspects of solar activity and its influence on terrestri phenomena such as temp., pressure, precip., thunderstorms and ozone, and on synoptic pro esses (cyclones, anticyclones, general circulation), on geomagnetic and radiation processes, a eventually on biological and chemical processes (physiological, psychological, birth and deat etc.) are summarized, with illustrations (graphs and tables) taken from many sources a extensive list of references which are cited throughout. The basic astrophysical factors a quantities—quiet and disturbed sun, visible and invisible ionospheric and magnetic radiatio solar constant, wave and particle radiation, chemical reactions due to radiations and t possible mechanism whereby solar, radiation, or magnetic phenomena influence human biological processes as well as weather processes, are treated. *Subject Headings:* **1. Sola terrestrial phenomena 2. Solar-weather relationships 3. Solar-biological relationshi** —*M.R.*

9.11–13 551.510.535(0

†Rawer, Karl, **The ionosphere: its significance for geophysics and radio communicatio** Trans. by Ludwig Katz. N. Y., Frederick Ungar, **1957.** 202 p. 72 figs., bibliog. p. 191–19 68 eqs. **DWB** (M10.535 R257io). Review in *Institution of Electrical Engineers, Journ* 4(44):463, Aug. **1958.** Review by T. W. Bennington in *Nature*, 182(4643):1116, Oct. **1958.** Review by E. V. Appleton in *Journal of Atmospheric and Terrestrial Physics*, Lond 12(2/3):223, **1958.**—A translation of the 1953 German text covering methods of observati of the ionosphere (radio, spectroscopic, geomagnetic, meteor and noctilucent clouds); resu

echo soundings and geomagnetic observations, (composition of air, excitation, pressure and sity, temp., ionization); theory of layer formation, deionization, etc., regular and irregular nges and the influence of the ionosphere on propagation and prediction of propagation ditions. (For abstract on 1953 German edition, *see* 6D–297, April 1955, *MAB.*) *Subject adings:* **1. Ionosphere textbooks 2. Ionospheric propagation. I. Katz, Ludwig** (*trans.*). *M.R.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: **Oceanog. cruise obs. and radiation meas.,** 9.11–74; **Statistical ocean wave frequencies, N. Atlantic** (Jasper), 9.11–75; **Climate, Leningrad** (Pokrovskaia), 9.11–269.

9.11–14 551.558.21:551.509.312:551.541

†Alaka, M. A., **Aviation aspects of mountain waves.** *World Meteorological Organization, Publication*] *WMO*, No. 68.TP.26; *Technical Note*, No. 18, **1958.** 48 p. 14 figs., 8 plates color), 43 refs., eqs. Also in: *WMO Bulletin*, 7(2):83–86, April **1958.** 2 photos. **DWB, LC**—The monograph discusses quite thoroughly present knowledge of mountain clouds, ing aspects of mountain waves, (vertical currents, turbulence at, above and below the crest el, errors in altimeters, wind speed variations and icing), observing or detecting mountain ves, conditions necessary for mountain wave formation, application of hydrodynamic theory lee wave prediction (QUENEY, SCORER and others) including stability effect of shape and e of mountains, multiple resonance, effect of a succession of ridges, inversions, etc., separation flow, sudden disturbances, reporting and forecasting; jet stream relations, forecasting rbulence and icing, etc. In the second paper, the author summarizes at some length the ain features of the monograph. *Subject Headings:* **1. Mountain waves 2. Lee wave forecasting.**—*M.R.*

9.11–15 551.577

*Barat, M., **Pluviologie et aquidimétrie dans la zone intertropicale.** [Analysis of rainfall d water supply in the intertropical zone.]*Institut Français d'Afrique Noire* (*IFAN*) *Dakar, émoires* No. 49, **1957.** 80 p. 15 figs., numerous tables. **DLC**—The author fixes three rameters: intensity, strength and duration, which allow a kinematical characterization of a infall. The study of these parameters involves the study of the variables determining the rameters, i.e., the diameter and amount of drops, their speed of falling down, and the duran of the rainfall. The parameters and the variables which authorize the definition of a ven rain on a concrete matter, are successively treated in the seven chapters of this work. his study makes it possible to determine the biological possibilities of culture or breeding, e areas of danger (deforestation danger, either with or without possibility of re-installment, d erosion danger) and permits us also to foresee the technical measures to be used and to udy the reasonable parcelling of culture and pasture-land zones. *Subject Heading:* **1. Pluometry.**—*A.V.*

9.11–16 551.513.7:551.515.7(213):551.577.38(43)

†*Clauss, Johannes, **Die Schwankungen des subtropischen Hochdruckgürtels als Indikator nganhaltender Trockenzeiten in Mitteleuropa, insbesondere langanhaltender Sommerckenheit in Deutschland.** [Fluctuations of the sub-tropical high pressure belt as an dicator of protracted droughts in Central Europe, especially protracted drought in Gerany.]. *Berlin. Freie Universität. Institut für Meteorologie und Geophysik. Meteorogische Abhandlungen*, 5(2), **1957.** 116 p. numerous figs., charts and tables. 33 refs. iog. note on author, p. (117). Thesis (Doctor of Natural Sciences)—Freie Univ., Berlin, **57. DWB**—A dissertation comprising a statistical study of general circulation anomalies er Europe in relation to cases of extreme drought over Germany. Daily synoptic charts d monthly and decadal mean and pressure anomaly charts for drought periods of summers ve a detailed, as well as a composite picture, of the pressure or circulation type which results extremely wet or dry summers in central Europe. Paths of anticyclones in years of extreme ought are shown on charts (1899, 1904, 1911 and 1921). The peculiarities of the circulation d weather in the dry summers are described in some detail. The general impression is that

an increase in the intensity of the subtropic high pressure belt, with a partial northward d placement especially at the Western margin of the continents, and a blocking over Europe an intensification of the Polar High, is responsible for the protracted summer droughts Germany. The 4 major chapters cover: 1) Relation of dry and wet summers to the press field; 2) The role of the subtropical high pressure belt; 3) Extreme cases; and 4) Statist correlations (e.g., relation to pressure in India). Almost 10 pages are devoted to charts a tables, etc. *Subject Headings:* **1. Drought, Germany 2. General circulation effects on drou 3. Summer rainfall anomalies 4. Germany.**—*M.R.*

9.11–17 551.50

*Cook Research Laboratories, Skokie, Ill., **Study to determine applicability of incremen modulations for communicating weather data.** Contract AF 19(604)-1385, Final Progr Report, FPR 75-1, Aug. 14, **1957.** 68 p. 34 figs. (some fold.), 8 refs.—A voluminous rep on theoretical and experimental investigations to find optimum modulating techniques transmitting incremental weather data, to design suitable transmitters and receivers, and compare rates of transmission in theory and practice under varying circumstances for tra mitting, digital and continuous data. Existing methods of teletype transmission, us WMO Region IV code, show the pulse width modulation system is 75 times as efficient. I upper air sounding transmissions, the entire run (using 100 ft intervals from sea level to 100,0 ft) can be transmitted in $\frac{1}{6}$ the time required to transmit the material in present code for *Subject Headings:* **1. Data transmission systems 2. Incremental modulation technic 3. Upper air data transmission.**—*M.R.*

9.11–18 551.508.21:551.50

Courvoisier, Peter, **Contributions to standard pyrheliometry.** Introd. by A. Ångströ and W. Mörikofer. *Sweden. Meteorologiska och Hydrologiska Institut, Meddelanden, Ser.* No. 13, **1957.** 51 p. Contents: **Über die Konstanz der Ångström-Pyrheliometer-Ska** p. 5–17. fig., 10 refs. **Absolutpyrheliometer-Vergleichungen, Davos, 1930–1946.** p. 18–4 3 figs., 27 refs., eqs. **DWB**—The new scale recommended for use during IGY by the Int national Radiation Conference at Davos, Sept. 1956, known as the International Pyrheliomet Scale 1956, is 1.5% higher than the original Ångström scale and 2.0% lower than the Smit sonian Scale of 1913. The Recommendation (#1) of the International Radiation Conferer of 1956, the history of the various standards and justification for present values are contain in Ch. IV. In Ch. II, P. COURVOISIER discusses the constancy of the Ångström pyrheliome scale of 1905 on the basis of comparisons of the Swedish standards Å 70 and Å 172, and th replacements Å 153 and Å 158. The average error prior to 1935 was 0.2% for all Ångströ pyrheliometers. The calibration factor of the standard differs by 0.4% from that of the oth Ångström pyrheliometers. In Pt. III the comparisons of silver disc (SD) and Ångströ pyrheliometers made at Davos are reported in detail, with graphs and tables. The effect atmospheric turbidity on the difference between SD and Å is considered and found to be u important. Average error of SD-SD is 0.6%; Å − Å = 0.25% and SD − Å = 0.4%. *Subj Headings:* **1. International Pyrheliometric Scale 1956 2. Pyrheliometer comparison.**—*M.R*

9.11–19 551.575.1:551.509.325:551.5

†Gal'tsov, Aleksandr Petrovich, **Analiz klimatoobrazuiushchikh protsessov v primene k geneticheskoĭ klassifikatsii tumanov.** [Analysis of climate producing processes through t application of genetic classification of fog.] Moscow, Izdat. Akad. Nauk SSSR, 195 203 p. 13 figs., 14 tables, 85 refs., eqs. **DWB** (M75.1 G181an)—The various genetic classific tions of fog are reviewed (PETTERSSEN, WILLETT, J. GEORGE and A. D. ZAMORSKII), the ro of condensation and sublimation in processes of fog formation and dissipation (low te perature, industrial pollution, saturation with respect to ice, etc.); local temperature a humidity changes as objective parameters for forecasting fog formation or dissipation; ro of turbulent exchange, advection of heat and water vapor, vertical transport, condensati and evaporation, and falling precipitation; classification of diurnal and interdiurnal therm dynamic processes in the microclimatic layer; meteorological and synoptic processes in t surface layers; genetic analysis of fog (formation, diurnal, cloud and wind effects and dis pation) are discussed and illustrated by schematic diagrams and illustrative tables, scatt

grams, etc. The entire treatment is aimed at illustrating the use of the scientific approach climatic analysis. *Subject Headings:* **1. Fog classification 2. Fog forecasting 3. Climatic fluences.**—*M.R.*

9.11–20 551.558.21:629.13

Harrison, H. T. (*Dir. of Met., UAL*), **Mountain wave zones in the United States.** *United r Lines, Inc., UAL Meteorology Circular*, No. 43, Sept. 1, **1957.** 35 p. 78 figs., 6 refs. **DWB** I:629.13 U58mc)—Replies to questionnaires sent to 200 U.A.L. pilots who have flown in rious parts of the U. S. provide the basic data for this survey of the mountain wave zones the U. S. The 18 general mountain wave zones are treated in geographical order, starting th the cascades and coast range in Washington and Oregon, the Coast Range, the Siskiyous d Sierras in Calif. to the Rockies, the Black Hills, Ozarks, the Appalachians, Alleghenies d Catskills, and finally the Adirondacks and White Mts. The most severe zone is that in olorado near Denver; next the Medicine Bow Mts. of SE Wyoming, and 3rd the Sierras in evada (Reno-Elko). A total of 59 terrain profiles across these ranges is presented. A gular mountain wave reporting program was begun in Feb. 1957, by the U. S. W. B. This veals some additional information not provided by the limited UAL sample based entirely memory. *Subject Headings:* **1. Mountain wave zones in United States 2. United Airlines lot reports 3. United States.**—*M.R.*

9.11–21 581.54:634.9 551.578.46:551.43

†Hermes, Karl, **Die Lage der oberen Waldgrenze in den Gebirgen der Erde und ihr Abstand zur Schneegrenze.** [Position of the upper forest limit in the mountains of the world nd its distance from the snow line.] *Kölner Geographische Arbeiten* (issued by Cologne. niv. Geographisches Institut), No. 5, **1955.** 277 p. Bibliog. (1721 refs.) at the end of most ctions. Appended in separate binder, 4 maps, 4 tables. Thesis (Ph.D.)—Cologne Univ. **LC** (QK938.F6H45)—An extremely thorough and systematic review of the world literature timber lines and snow line, arranged by continent and countries or regions for the two types data. A number of isoline charts show contours of height of each (by continents) and fference in height between the snow and the timber line. The various definitions of tree timber line and snow lines are mentioned—the purpose of the work, difficulties and errors, olar limits, and types of trees considered. The data for thousands of places are discussed in aragraph rather than tabular form. Reference lists at end of chapters are very complete rough 1952. *Subject Headings:* **1. Tree line 2. Snow line.**—*M.R.*

9.11–22 551.506.3:551.524(437)

†*Konček, Mikuláš, **Teplotné pomery Bratislavy.** [Temperature conditions of Bratislava.] ratislava, Slovenska Akadémia Vied, **1956.** 80 p. 27 figs., 47 tables, 44 refs. Russian, erman and English summaries p. 77–80. **DWB** (M82.1/437 J82te). Review in *Meteorogické Zprávy*, Prague, 10(3):84, March **1957.**—An elaborate and systematic analysis of a 00 -yr record of temperatures for Bratislava (1851–1950). Records from several locations in ratislava are homogenized to allow comparison of one period with another. The climate was nsidered continental until the 1890's, then from 1911–20 it reached a peak of "maritime" haracter, reverting again to a variable "continental" character which reached its maximum 1941–50. Details of sites of stations, nature of records, methods of compilation and adstment; frequencies of monthly mean, extreme and interdiurnal temperature changes, egree-days, aperiodic variations, secular trends, hourly variations during the different seasons, c. are presented in tables and curves and isopleth charts, and discussed. A map and several notographs show locations of stations and surroundings. *Subject Headings:* **1. Temperature Bratislava 2. Long period temperature records 3. Air temperatures 4. Bratislava, zechoslovakia.**—*M.R.*

9.11–23 551.506.7:551.557(264)

*Kuhlbrodt, Erich, **Die Höhenwinde über dem tropischen und südlichen atlantischen zean (Messungen der Deutschen Seewarte bis 1939 eingeschlossen), erste Lieferung, bschnitt A, Allgemeine statische Bearbeitung der Höhenwindmessungen.** [Upper winds er the tropical and southern Atlantic Ocean (Deutsche Seewarte measurements through

1939), First issue, Section A, General statistical analysis of upper wind measurement *Deutsche Atlantische Expedition (Meteor), 1925–1927, Wissenschaftliche Ergebnisse*, Vol. Pt. 1, Ergebnisse der Aerologischen Beobachtungen. Berlin, Walter de Gruyter, **1958.** 9 3 figs., 17 charts, 7 tables. Also: **Zweite Lieferung, Abschnitt B, Weitergehende statistis Bearbeitung für ausgewählte Felder.** [Second issue, Section B, Detailed statistical anal for selected areas.] *Ibid.*, Vol. 16, Pt. 1, p. 93–168, Berlin **1958.** 28 figs., 27 charts, 36 tab **DLC**—Results of 7000 pilot balloon ascents made by the Deutsche Seewarte in the tropical South Atlantic Ocean, are summarized and presented in tabular and graphic form. highest flights obtained were to 22 km. A chart shows the regional and seasonal distribut of the 4600 ascents made up to the end of 1937 between 20°N and 75°S. Methods of co putation, vertical sections over the ocean (by seasons) and variability are given on charts graphs, and extensive tables give the wind (direction and speed) frequencies at different lev seasons for 10° lat.×30° long. belts, and mean wind factors (vector and scalar speeds a constancy) for 5° lat.×5° long. areas from 20°N. to 30°S. and 5°×10° areas S. of 30°S. flights began in 1924 and continued through 1939, and are evenly distributed throughout year (400–500 a month). Only about half of the 5200 flights tabulated reached 5000 $\frac{1}{6}$ reached 10,000 m, 5% 15 km, and 122 reached the stratosphere (18 km). In high latitu the flights were much shorter than in low latitudes. While Sec. A contains semi-annual val for the entire region, Sec. B gives quarterly or monthly values for areas for which sufficie data are available. Seasonal variations of vertical wind distribution and of nonperio variations are included. The data are presented without comment; their detailed discuss is forthcoming as Sec. C. *Subject Headings:* **1. Upper air winds 2. Upper air wind d summaries 3. South Atlantic 4. Tropical Atlantic.**—*M.R.*

9.11–24 551.582.2:551.506.3(4

*Mollwo, Hans, **Klimawerte von Frankfurt/Main, 1857–1956.** [Climate values of Fra furt a. Main, 1857–1956.] *Germany. Deutscher Wetterdienst, Berichte*, 6(43), **1958.** 60 45 tables, 9 refs. **DWB, DLC**—Sporadic temperature observations were made in Frankf a/M before 1758, when regular measurements began, and continued to 1786. Other historic notes and a 100-yr record (1857–1956) of temperature and precipitation are analyzed a presented in tables in various ways (means, frequencies, extremes, durations and annu values), along with sunshine data (1908–56), relative humidity and vapor pressure (188 1956), thunderstorm (1857–1956), snow and snow cover (1857–1956), atmospheric pressure a wind direction frequencies (1857–1956) and wind speed (1951–6). *Subject Headings:* **1. C matic data 2. Climate of Frankfurt a. Main 3. Frankfurt a. Main, West Germany.**—*M.*

9.11–25 551.586:612:159

†*Mücher, Hans, **Psychische und physiologische Wirkungen des Wetters.** [Psychologic and physiological effects of weather.] Aulendorf i Württ., Editio Cantor, **1957.** 123 25 figs., 23 tables, bibliog. p. 121–123. (Arzneimittel-Forschung, No. 7.) **DWB** (M86:6 M942ps). Review by R. Knepple in *Angewandte Meteorologie*, Berlin, 3(2):61, **1957.** Revie by H. E. Landsberg in *Amer. Met. Soc., Bull.*, 38(7):436–437, Sept. **1957.**—A small, well-bou monograph covering systematically and in extreme detail, present knowledge and ideas on t effect of weather conditions (radiation, temperature, wind, humidity, cloudiness, ozone, etc On the physical and psychological behaviour of human beings—fatigue, alertness, efficienc response to stimuli, hypnosis, drugs, etc. with emphasis on controlled experiments and aut matic recording of responses or coordination of small muscular action. Compensation physiological and neurological responses to weather or drugs is recognized as one of the co plicating factors, another is the complex of weather conditions. *Subject Headings:* **1. Weath effects on man 2. Medical meteorology 3. Psychological effects of weather 4. Physiologic meteorology. I. Distler, Hans II. Konradt, Hans-Joachim III. Ungeheuer, Ha IV. Grünewald, Gerhard.**—*M.R.*

9.11–26 551.521.14:551.57

Peugh, Laura V. and Melnick, Donald A., **Cloud albedo.** Operations Research In Silver Spring, Md., Technical Report, No. 47; Contract AF 19(604)-1422, Scientific Repor No. 4, May 10, **1958.** 47 p. 4 figs., 46 refs., eqs.—This report is the result of an extensiv

erature survey and personal interviews in an attempt to find information on the transmission d albedo of clouds. Because of the scarcity of information found to be available, the present ort is limited to the discussion of transmission and albedo as function of cloud type and ickness. The only direct data, that of NEIBURGER on stratus, show that the formula veloped by ORI in TR 14 is a reasonable fit, if a value of 40 m is assumed for the visibility. r other types of cloud, only cloud physics data, such as visibility, liquid water content, and op size spectra, are available. As far as can be determined, within the limits of the accuracy the data, these cloud types each have an average visibility around 40 m. However, the riation between the results of different observers is very high. Also the variation of the sults within one cloud type is high. The best estimate possible from the presently available formation for the transmission as function of thickness for any type cloud is achieved by ing a visibility of 40 m in the ORI formula. *Subject Heading:* **1. Albedo of clouds.**—*Authors' stract.*

9.11–27 551.594.5:551.506(931,94)

*Thomsen, I. L.; McQuistan, G. W. and Frankpitt, B. L., **Observations of the Aurora ustralis, 1930–1954.** Wellington, N. Z. Carter Observatory, Contract AF 64(500)-4, ientific Report No. 5, **1957.** 290 p. numerous tables. Also: McQuistan, G. W. and rankpitt, B. L., **Observations of the Aurora Australis, 1955–1956.** *Ibid.*, Report No. 6, **1958.** 3 p. numerous tables. **DWB**—A voluminous report on details of auroral observations made New Zealand, Australia and Southern Ocean by a network of >300 regular observers (total umber in report to date is 729) reporting since 1939 to the Carter Observatory (prior to 1939 nder the supervision of the Royal Astronomical Society of New Zealand). The collection nd assembling of these observations have become the chief function of the Observatory. ystematic methods have been used since 1935, and a manual was issued in 1949. All ob- rvers are voluntary except those at 11 New Zealand Meteorological Stations. Photographic bservations have been made since 1950, but only visual observations are included in this ompilation. Each observation is assigned a reference number which is followed in Section I y date, time first and last seen, and maximum, main forms, lat. and long. of station, intensity n Sec. II color; and, when available, altitude and azimuth (in Sec. III) of East, Central and Vest portions of display. In Sec. IV is an extensive presentation of details of individual isplays (p. 120–273) wherever a further analysis is possible. The present volumes supersede ll previous publications by Carter Observatory on this subject, and the material has been hecked and verified. The number and location of observers and the extent of the observations f each display is mentioned, and the chronological features of the given display tabulated, ne colors listed, etc. Sec. V (p. 274–290) gives a series of notes on glows, rays, bands, arcs, iffuse surfaces, draperies, coronae, flaming aurorae and on the development of displays in eneral as deduced from specific cases cited. One display (March 28, 1946) was seen at New- astle Waters, N. Territory, Australia, at 170°S. lat. The same display was seen in Northern lemisphere. Report No. 6 repeats general outline of No. 5 (for 1955–6). *Subject Headings:* **Aurora Australis catalogs 2. New Zealand 3. Australia.**—*M.R.*

9.11–28 551.506.3:551.515.2(263.5,75,76)

*§U. S. Navy. Fleet Weather Central, Miami, Florida, **Annual Report of Hurricane Season, 955.** Issued **1956?** Its *OPNAV Report* 3140.9. Each section (storm) repaged. Numerous harts. **DWB** (M15.2 U585as). Also: **Annual Report of the Hurricane Season, 1957.** Its *PNAV Report*, 3140–9, **1958.** 100 p. charts and tables, 6 refs. Title on cover: Annual ropical Storm Report, 1957. Appended, its *OPNAV Report*, 3140–10, Annual weather econnaissance report from Airborne Early Warning Squadron Four. 10 p. charts, tables. **WB** (M15.2 U587as)—This voluminous report is the fourth such annual report issued by ne Miami Fleet Weather Central for hurricanes of the seasons from 1952 on, which occurred the Atlantic, Caribbean and Gulf of Mexico. The methods of forecasting warning, analysis nd verification are treated and the numerical results of the verification presented and analyzed. Iethods of aircraft observation are also evaluated. A verbal account is given of each tropical yclone ("Alice" to "Katie") in the season, radar photographs are presented, regular hurricane orecasts evaluated and storm tracks plus surface 700, 500 and 200 mb synoptic charts for the rea presented for each separate cyclone. Reconnaissance fixes and data are shown on charts

and in tables. Also a graph for each storm shows maximum velocity vs. time. The 19 season was the second bad year in a row. "Connie," "Diane" and "Ione" ravaged a flooded the east coast, and "Janet" was one of the worst in the Caribbean and Mexico. (I report on 1956 season, *see* 8.11–16, Nov. 1957, *MAB.*) *Subject Headings:* **1. Hurricane seas reports 2. Annual hurricane reports 3. Hurricane analyses—1955 4. Hurricane analys 1957 5. Caribbean 6. Atlantic states.**—*M.R.*

ATLASES

9.11–29 551.582.3:551.587(26

*U. S. Office of Naval Operations, **U. S. Navy marine climatic atlas of the world, Vol. Indian Ocean.** Its *NAVAER* 50-1C-530, Sept. 1, **1957.** xvii p. 267 charts 33×50 c **DWB** (M82.3 U585m)—This handsome atlas, like the two preceding volumes published in 19 and 1957 (surface and upper air data for the Atlantic and the Pacific Oceans, resp.), is made from machine compilations of raw data, and presented in the form of charts of mean valu (isopleths) or frequency distributions (wind-roses, pasts or ups for ocean squares or isla stations), and especially multiple distribution graphics. It is intended for operational well as research purposes. Data for 40 upper air wind and 26 radiosonde stations were us (and are listed with coordinates and length of record). Surface charts include winds, ga roses, precip., visibility, cloudiness, wind-visibility-cloudiness, dew point, temp., wet bu temp., temp. and wind speed, sea level pressure, air-sea temp. diff. and tropical cyclones Upper air charts comprise wind aid or retard values, wind roses, height of 850, 790, 500, 3 and 200 mb. surfaces, temp. and humidity, modified refractive index, inversions, height tropopause, height of freezing level and potential aircraft icing graphs. (For abstract c Vol. 1, North Atlantic Ocean, *see* 8.5–81; Vol. 2, North Pacific Ocean, see 8J–116, *MAB Subject Headings:* **1. Marine climatic atlases 2. Upper air atlases 3. Indian Ocean. I. U. S Weather Bureau.**—*M.R.*

NEW SERIALS

9.11–30 532.5:0

The Physics of Fluids, N. Y., 1(1), Jan./Feb., **1958.** Pub. by American Institute o Physics. Editor, François N. Frenkiel. Bi-monthly (until further notice). Price: Annua Members of the Institute, $8.00 (domestic), and $9.00 (foreign). Nonmembers, $10 and $11 From Institute, 335 East 45th Street, N. Y. 17, N. Y. Includes author's abstract with each article. For listing of contents of 1(1), *see* p. 232, Feb. 1958, *MAB.* Pertinent articles ab stracted separately.—The American Physical Society already has well established journal in special fields, such as chemical physics, optics and acoustics. Now the Div. of Fluid Dy namics has launched a new periodical devoted to original articles on the theory, structure statistical mechanics and general physics of gases, liquids and other fluids including magneto hydrodynamics, boundary layer and turbulence phenomena, ionized fluids, physics of plasmas super and hypersonics, physical aeronomy, upper atmosphere (rarified) gas phenomena and other liquid state physics applicable to geophysics, astrophysics, biophysics, etc. A few research notes and letters to the editor will be published. The first issue contains a number of articles on shock wave behaviour, statistical theory of turbulence, diffusion in laminar boundary layer flow, bubble chamber theory, hydro-magnetodynamics, etc. The impressive list of names on the board of editors includes S. Chandrasekhar, H. L. Dryden, W. M. Elsasser, J. Kaplan, E. Teller, F. N. Frenkiel and several other authorities in this field. *Subject Headings:* **1. Serial publications 2. Physics of fluids 3. Fluid dynamics. I. Frenkiel, Francois N.** (*ed.*).—*M.R.*

9.11–31 551.506.1:551.521.1(52)

*Japan. Meteorological Agency, Tokyo, **Actinometric Bulletin,** No. 34, 1956. Issued Tokyo, **1958.** 65 p. Almost entirely tables. **DWB**—Five day means of global or whole sky (solar and sky) radiation on a horizontal surface for each hour and for the day, measured with Robitzsch actinographs at 60 stations in Japan during 1956 are tabulated. The observations began in 1931 and the network in 1935 with 8 stations increased to 60 stations in 1945, decreased to 30 in 1948–51 and has now been built up to 60. The constants of the instruments

determined by a standard silver-disk pyrheliometer (No. 757) at the Japan Meteorological ency in Tokyo. (For abstract on earlier issues, *see* 4.3–44, March 1953, *MAB.*) *Subject adings:* **1. Actinometric data 2. Global radiation data 3. Robitzsch actinograph 4. Actometric networks 5. Japan.**—*M.R.*

9.11–32 551.510.535(041)

Calcutta. Univ. Institute of Radio Physics and Electronics. **Research Report, Vol. 7, 54/1955.** Issued 1955? 142 p. figs., refs., eqs. **DWB** (M10.535 C144r)—This is a ries devoted mainly to reprinting articles on ionospheric physics by staff members of the stitute (founded in 1949). Even as early as 1930, the director of the Institute, S. K. Mitra, ade ionospheric observations at that time only experimental ionospheric station in the East. ol. 7 of these reports contains 10 articles on such subjects as Ionization distribution in F-gion, Sporadic E ionization during thunderstorms and on movement of Sporadic E clouds. *ubject Headings:* **1. Ionospheric research reports 2. Collected reprints. I. Saha, A. K.** (*ed.*) **Mitra, S. K.** (*Director*).—*M.R.*

MANUALS

See also: **IGY instruction manual on radioactive tracers** (Facy), 9.11–107; . . . (Machta), 9.11–108 and 109.

9.11–33 551.509.58:629.139.5:551.510.53(02)

§†*U. S. Air Weather Service, **Forecasting for aerial refueling operations at mid-tropospheric ltitudes.** Its *AWSM Manual* 195-52, July **1957.** 110 p. 32 figs., 17 tables, 54 refs., eqs. **DWB** (M055 U58am)—Detailed techniques are outlined for forecasting suitable or unsuitable eather for aircraft refueling at 15,000–20,000 ft over the N. Hemisphere. Cloudiness, isibility, turbulence, icing, winds, and contrails are the factors to be considered. Analysis rom indirect and direct (observational) evidence, the forecast problem (dynamics, extra-olative, space-mean, associative, cloud system and other techniques); the systematic pro-edures for forecasting acceptable or unacceptable conditions for <24 hrs, 24–36 hrs and >36 hrs; climatological probabilities useful in operational planning, and a good bibliography f pertinent works reviewed in the manual. Numerous tables, nomograms, sounding diagrams, tatistical presentations on maps, charts and diagrams, and schematic diagrams illustrate the ext. *Subject Headings:* **1. High altitude flying forecast manuals 2. Aerial refueling 3. Mid-roposperic refueling forecasts 4. Aeronautical meteorology.**—*M.R.*

9.11–34 551.524.36(02)

*American Petroleum Institute, N. Y., **Handbook of degree-day data for the United States.** N. Y., Issued by the Institute, **1958.** 2 vol. Vol. 1, **Statistical summaries.** 210 p. Vol. 2, **Basic degree-data.** 188 p. Both volumes almost entirely tables. Price: per vol. $7.00. **DWB?**—Vol. 1 of these two nicely bound volumes contains charts and statistical tables of ormal and standard duration of monthly or seasonal heating degree days for 169 stations in he United States and 2 in Canada for 1920–50, and normals for 355 stations. The detailed ata for the stations from which the statistics in Vol. 1 were derived are published in Vol. 2. robabilities of specified number of degree days in warmer or cooler than normal years are lso tabulated in Vol. 1 to give an indication of the variability of the parameter at each place. Detailed explanation of sources of data, method of compilation, formulas used, trend statistics or each decade, etc. are contained in text prepared by Jerome Spar. Monthly and annual alues for 25–55 years for 169 stations in the U. S. and 2 in Canada are contained in Vol. 2. tation histories are indicated in tables and in appendix. *Subject Headings:* **1. Degree day andbook 2. Heating degree day data 3. United States. I. Spar, Jerome.**—*M.R.*

POPULAR METEOROLOGY

9.11–35 91.04(99) 551.506.22

Barashev, Pavel Romanovich, **Sputniki Oriona.** [Companions of Orion], Moscow, Molodaia Gvardiia, **1957.** 146 p. photos, map. **DLC** (G880.B36)—A popular book on the

Antarctic expeditions in support of Soviet IGY work at Mirny. Pictures of the "Ob," t "Lena," and the activities of ships, aircraft and scientists in the Antarctic accompany t text. Emphasis is on geological and glaciological work. Earlier work on the drifting Arc ice floes is also described. The title comes from the fact that Orion is visible from both t Arctic and Antarctic bases—hence the men who carry on in both polar regions are always sight of or companions of that well-known constellation. *Subject Headings:* **1. Antarc expeditions 2. IGY Antarctic expeditions 3. Soviet Antarctic expedition 4. Mirny, An arctica.**—*M.R.*

9.11–36 551.5:061

†Hartwell, Frank W. (*U. S. W. B., retired*), **Forty years of the Weather Bureau: t transition years.** Foreword by F. W. Reichelderfer. Handset and printed by the auth at Long Train Studios, Bolton, Vermont, **1958.** 173 p. illus., bibliog. p. 165–167. **DL** (QC875.U7H38)—The author recounts many incidents shedding light on the transition period of the U. S. Weather Bureau from his entrance into the service ca. 1900 as a print at Lincoln, Nebraska to his retirement in (1935). During this period he served in char of a special hurricane station at Cienfuegas, Cuba in 1904, Key West and Sand Key, Florid Richmond, Va. in 1908, San Juan, Puerto Rico, 1909–1919 and 1930–35, Burlington, V 1919–1930 and retirement in 1935, at age of 62 (compulsory after 15 years of service in tropic to spend the last quarter of a century in Vermont. A chronology of hurricanes in Puer Rico and a glossary of meteorological terms are appended. *Subject Headings:* **1. U. S. Weath Bureau 2. History of U. S. Weather Bureau 3. Hurricanes of Puerto Rico 4. San Jua Puerto Rico.**—*M.R.*

9.11–37 551.507.36

*†Ley, Willy, **Rockets, missiles and space travel.** Rev. and enl. ed. N. Y., Viking Press **1957.** 527 p. 85 figs., numerous tables, bibliog. p. 489–520. **DWB** (629.14353 L681r)—A pioneer and well illustrated book on rockets, first published in 1944 and reprinted at time under varying titles (2 complete revisions in 1947 and 1951), giving the history, developmen and use of rockets up to World War II, during the war (V-2) and after the war, the Peenemünd and White Sands centers and work there, ideas of satellites and space ships, and an appendi giving useful data on characteristics of various types of rockets, both German and American on rocket mail, rocket societies and literature published in English, French, German, Italian Russian, etc. The bibliography is very extensive and the text and drawings include th design of the Vanguard before Sputnik I was launched. *Subject Headings:* **1. Rockets 2. Sat ellite observatories 3. Space ships.**—*M.R.*

9.11–38 551.5(023

Spar, Jerome, **The way of the weather,** In co-operation with the American Museum o Natural History, N. Y. Mankato, Minn., Creative Educational Society, **1957.** 224 p photo on verso of each page. Price: $4.95. **DLC** (QC863.S67)—This excellent popular book on the elementary aspects of meteorology contains a series of one-page essays or descriptions each facing a full (large) page, illustration or diagram. Some of the subjects treated are thunderstorms, hail, rainbows, sea breezes, the lower atmosphere, the upper atmosphere solar flares, monsoons, hurricanes, hurricane reconnaissance, balloons, radiosondes, weather radar, weather ships, rockets and satellites, weather maps, snowflakes, ice storms, cloud seeding atomic energy and weather, cyclones, fog, smog, frost, chinooks, floods, tornadoes, squall lines, etc. The numerous subjects are grouped under 11 chapter heads: I. The ocean and air; II. Our weather; III. Summer; IV. Fall; V. Winter; VI. Spring; VII. Other peoples weather; VIII. Observing the weather; IX. New tools for the weatherman; X. Forecasting; XI. Changing the weather. Appended are a wind estimation table and a cloud coding "atlas." The illustrations are vivid and pertinent. *Subject Headings:* **1. Popular meteorology books 2. Elementary meteorology.**—*M.R.*

TRANSLATIONS

See: **Theoretical hydromechanics** (Kochin et al.), 9.11–8.

GENERAL GEOPHYSICS AND METEOROLOGY

IGY

See also: **Antarctic circulation and tropopause charts** (Rastorguev), 9.11–58; **IGY instruction manual on radioactive tracers** (Facy), 9.11–107; . . . (Machta), 9.11–108 and 109; **IGY atmos. elec. stations** (Mühleisen), 9.11–298.

9.11–39 551.506.22

Pinus, N. Z., **Briussel'skaia sessiia spetsial'nogo Komiteta po provedeniiu Tret'ego Mezhdunarodnogo geofizicheskogo goda.** [Brussels Session of the Special Committee on Procedures for the third International Geophysical Year.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:59–60, Jan. **1956. DWB, DLC**—A report on the session of the Special Committee for the Third Geophysical Year held at Brussels, Sept. 8–14, 1954. A list of the Soviet delegates is given and the special tasks assigned to the U.S.S.R. and the various proposals presented by the U.S.S.R. are summarized. *Subject Headings:* **1. Soviet program for IGY 2. CSAGI meeting, Brussels, Jan. 1956.**—*I.L.D.*

9.11–40 551.507.362.1:550.3:551.506.22

Spencer, N. W. (*Mich. Univ.*), **E. E. Department's part in IGY: Rocketry.** *Michigan Technic*, Ann Arbor, Mich., 74(7):26–27, 58, 70, April **1956.** photos, port. **DLC**—The "aerobee" and Cajun rockets to be used during IGY are described and illustrated and the elements to be measured, different methods of obtaining ambient air temperature by "aerobee," and other aspects of the proposed firings during 1957–8 are discussed. The part the Electrical Engineering Dept. of Michigan Univ. is to play in this upper atmosphere research program during IGY is emphasized. *Subject Headings:* **1. IGY rocket program 2. Aerobee rockets 3. Nike-Cajun rockets.**—*M.R.*

ARCTIC RESEARCH

See also: **Commercial polar flights, Thule Airport, Greenland,** 9.11–89; **Temp. gradient, Greenland** (Hamilton), 9.11–209.

9.11–41 551.506.5 91.04(269)

Bauer, Albert, **Wissenschaftliche Ergebnisse der französischen Polarexpeditionen Adélie-Land (Antarktis) 1948 bis 1952 und Grönland 1948 bis 1951.** [Scientific results of the French polar expeditions, Adélie Land (Antarctia) 1948–52 and Greenland 1948–51.] *Naturwissenschaftliche Rundschau*, 5(1):1–8, Jan. **1952.** 15 figs. **DWB**—Account of organization of expedition in "Commandant Charcot" to Adélie Land. A station was established at Pt. Martin in Feb. 1950 (photo). Organization of Greenland expedition described with account of gravity measurements, geodetic levelling and cross section of inland ice. *Subject Headings:* **1. Antarctic expeditions 2. "Commandant Charcot" Cruise 3. Adélie Land 4. Antarctica 5. Greenland.**—*C.E.P.B.*

9.11–42 551.506.5(268)(02) 656.61(268)

Singer, Maks Emmanuilovich, **Razbuzhennyĭ okean. Pervaia Severo-vostochnaia poliarnaia kolymskaia ekspeditsiia 1932–33 gg.** [Exploration of the ocean: first Northeastern Polar Kolymsk Expedition, 1932–33.] Moscow, Moskovskoe t-vo Pisatelei, **1934.** 201 p. photos, map. **DLC**—Illustrated account of "Litke" Expedition from Vladivostok to the Kolyma—the reverse of the usual direction of travel across the Northern Sea Route. Details of meteorological and oceanographical observations, at sea and along the coasts. Illustration shows meteorological station at Nizhne-Kolymsk. The "Litke" led a group of river and sea supply ships and barges. *Subject Headings:* **1. Litke Expedition, 1932–33 2. Northern Sea Route 3. Nizhne-Kolymsk, Asiatic U.S.S.R.**—*M.R.*

9.11–43 551.582.2:551.578.46(98)

Corbel, Jean, **La neige dans les régions hautement polaires (Canada, Groenland) au-delà du 80° latitude nord.** [Snow in the high polar regions—Canada, Greenland—above 80° North latitude.] *Revue de Géographie Alpine*, Grenoble, 46(2):343–366, **1958.** 10 figs. (incl.

photos), 17 refs. **DWB**—The only land areas north of 80°N. are Peary Land of N. Greenla and extreme north Ellesmere Island and north Axel Heiberg Island. The islands are ve mountainous and rugged, and rise to 10,000 ft, whereas Peary Land is much flatter rising or to 6000 ft. Data on climate and snow cover at Eureka, Alert and Isachsen are presented a discussed in comparison with N. Greenland and Siberia. Snow occurs occasionally in wint at −20° to −35°C when inversions due to advection of warmer, moister air occur. Su inversions at Alert are shown on adiabatic-type diagrams or cross-sections. In summe precip. is more abundant and is fairly uniform, but snow cover is not uniform owing to stro winds. Eureka is driest Arctic station. Snow structure, density, wind glaciers and dun effect of turbulence and morphology are discussed and illustrated schematically. *Subj Headings:* **1. Arctic snow cover 2. Climate of extreme Arctic Canada 3. Snow structure Arctic 4. Canadian Arctic 5. Alert, Canada.**—*M.R.*

9.11–44 551.506.5(98

Troelsen, Johannes C., **Danish Pearyland Expedition, 1947–50.** *Polar Record*, 6(44):46 473, July 1952. fig., 2 photos, refs. **DLC**—Includes history of expedition, landing conditio (seaplane) and a summary of scientific results including meteorology. Observations were ma every 3 hours for 2 years at the base and for most of the year at 1100 m. *Subject Heading* **1. Arctic expeditions 2. Danish Pearyland Expedition, 1947–1950 3. Peary Land, Greenlan** —*C.E.P.B.*

9.11–45 64:91.04:551.582(98

Weiss, Gottfried, **Ausrüstungserfahrungen von einer Grönlandexpedition.** [Experienc in equipping a Greenland expedition.] *Polarforschung*, Ser. 2, 20(1/2):328–332, **1950. DW** —Describes outfitting of a German expedition wintering in N.E. Greenland in 1942/3—hu construction, food, clothing and lessons learned. *Subject Headings:* **1. Arctic expeditio equipment 2. Greenland.**—*C.E.P.B.*

ANTARCTIC RESEARCH

See also: **Exped. "Commandant Charcot," Adélie Land** (Bauer), **9.11–41; Chatham Is. Exped. (1954) and oceanog. surveys** (Knox), **9.11–72.**

9.11–46 551.582.2(99.42

*Burdecki, F., **Climate of the Graham Land region.** (In: **Meteorology of the Antarcti** ed. by M. P. van Rooy. Pretoria, **1957.** p. 153–171. 3 figs., 18 tables.) **DWB**—A com plete statistical analysis of available data from 9 stations in the Graham Land sector of th Antarctic. Temperature, wind and cloudiness are given the most thorough treatment humidity, visibility and ice conditions are also described. Seasonal frequencies of visibility i 10 class intervals (ranges) are presented for Argentina, Deception, Signy, and Laurie Island and Admiralty Bay, and then table gives percent mean relative humidity and mixing ratio fc each month for 9 stations. Monthly mean temperatures are available for 18 locations, bu records are for short periods of time. Charts showed mean isotherms for the Sector, for ever second month (Jan.–Nov.). *Subject Headings:* **1. Climate of Graham Land Region 2. Cli matic data 3. Graham Land, Antarctica. I. South Africa. Weather Bureau.**—*M.R.*

9.11–47 551.582.2(99

†*Fabricius, A. F., **Climate of the Sub-Antarctic Islands.** (In: **Meteorology of the Ant arctic,** ed. by M. P. van Rooy. Pretoria, **1957.** p. 111–136. 6 figs., 22 tables, refs.) **DWB**— Data for Stanley, Grytviken, Marion, Kerguelen, Heard, Macquarie, and Campbell Islands ar considered in this analysis of climatic factors in the region from 47° to 54°S. embraced b these stations. Sunshine (T stations), global radiation (3 yrs Marion Island), wind frequencie (7 stations), temperature (temperature anomalies) annual regime, daily variation frequencies standard deviation and skewness in winter and summer frequencies, etc. are given. Th frequency tables are quite extensive although based on only 5–10 yrs of record. For eac element, data for each station or island are discussed separately. *Subject Headings:* **1. Climat of sub-Antarctic Islands 2. Sub-Antarctic Islands.**—*M.R.*

9.11–48 551.587(99)

†*Hofmeyr, W. L., **Upper air over the Antarctic.** (In: **Meteorology of the Antarctic,** ed. M. P. van Rooy. Pretoria, **1957.** p. 173–208. 12 figs., 9+tables, 4 charts, refs.) **DWB** Since 1911 meteorograph or airplane ascents have been made at 3 places and radiosonde ascents made at 15 places in the Antarctic and sub-Antarctic. Mean geopotential heights, geostrophic flow, temperature gradients, surface inversions, tropospheric and stratospheric lapse rates, periodic variations in geopotential and winds, nonperiodic variations are treated in tables, charts, meridional cross sections, and mean monthly upper air soundings, curves, etc. The conclusion is reached that the free air circulation and characteristics are simple and depend largely on latitude, just as the surface conditions do. Polar charts show the mean hypsometric for Jan. at 700, 500 and 300 mb and July at 500 mb for area S. of 45°S. Tables give mean monthly upper air flow and wind frequencies at 5 stations; and upper air temperature and height data for 9 stations and 24 ocean squares. *Subject Headings:* **1. Upper air temperatures 2. Upper air winds 3. Upper air climatology 4. Inversions in Antarctic 5. Antarctica and Sub-Antarctic Islands.**—*M.R.*

9.11–49 551.515:551.542(99,269)

†*Hofmeyr, W. L., **Atmospheric sea-level pressure over the Antarctic.** (In: **Meteorology of the Antarctic,** ed. by M. P. van Rooy. Pretoria, **1957.** p. 51–70. 12 figs., 14 tables, charts, refs.) **DWB**—The mean monthly and annual pressure field derived from data for 10 stations or groups of stations and from ship reports (1882–1955) on the Antarctic continent and islands, and for 26 oceanic squares is shown in tables and on isobaric charts. Mean meridional profiles for S. Hemisphere compared with N. Hemisphere (50°–90° S. and N.), zonal indices in westerly and easterly belt for different longitudinal intervals and months (with harmonic parameters), the Antarctic anticyclone (cross sections to 8 km), half yearly pressure oscillations, diurnal and aperiodic changes, frequencies of pressure, standard deviations, interdiurnal and six-hourly variations, simultaneous and autocorrelations of pressure are discussed in a most thorough manner and the text supported by analytical tables, curves and charts. The area is almost ideal for a uniform planetary circulation model. Interdiurnal pressure changes average 8 mb but may reach 50 mb. *Subject Headings:* **1. Antarctic pressure fields 2. Antarctic Ocean pressure data 3. Antarctic Ocean 4. Antarctica.**—*M.R.*

9.11–50 551.577(99) 551.573(99)

†*Loewe, Fritz, **Precipitation and evaporation in the Antarctic.** (In: **Meteorology of the Antarctic,** ed. by M. P. van Rooy. Pretoria, **1957.** p. 71–90. 24 tables, 5 charts, ref.) **DWB**—Records of precipitation are not long or consistent in Antarctic (S. of 55°S.); only 1 station (Scotia Bay in S. Orkneys) has over 50 yrs of record, most of the others <15 yrs in sub-Antarctic and <10 yrs on coast of Antarctica. Until June 1956 none had been made inland. Unusual problems are encountered on the Ice Cap due to the blizzards, rime and hoar frost or drifted snow deposits and to evaporation, although deposition and evaporation are slight owing to low temperature and water vapor content. Precipitation data from 6 stations in the Graham Land sector are presented in a table of monthly and annual means for 2–10 yrs. Data on days with precipitation are available from 18 stations, for variable periods and by amounts and types for 1 or more stations. More stable and detailed data on precipitation are available from the sub-Antarctic islands, and frequencies are tabulated for sub-Antarctic seas. Evaporation from the Ice Cap is discussed and data for Macquarie and Laurie Island analyzed and tabulated in some detail. Large charts show seasonal precipitation and frequency of precipitation and monthly evaporation. *Subject Headings:* **1. Antarctic precipitation data 2. Antarctic evaporation 3. Antarctic Seas 4. Antarctica.**—*M.R.*

9.11–51 551.508(99)

†Nagel, J. F., **Meteorological instrumentation and observation in Polar regions.** (In: **Meteorology of the Antarctic,** ed. by M. P. van Rooy. Pretoria, 1957. p. 39–50. refs.) **DWB**—The effect of the Antarctic weather and climate on the observer, problems of barometry (mercury, aneroid and altimeter), surface wind observation (pressure plate, Dines pressure tube, and cup), sunshine recorders, radiation instruments, sling thermometers of 6 types, thermographs, electrical thermometers, sea-water thermometers, hygrographs, infrared

hygrometers; cloud, visibility and precipitation and evaporation measurements, automa weather stations, radiosondes, pilot balloon and radio-theodolite equipment, are discussed some detail. Suggestions for cold weather, blizzards, weather near freezing (icing), s journeys and spare parts to be maintained on expeditions are included. Accuracy of inst ments under severe conditions is considered. Advantages and disadvantages of the vari types are also enumerated. *Subject Headings:* **1. Meteorological instruments 2. Antarc instrument performance 3. Antarctica.**—*M.R.*

9.11–52 551.509.3(

*†§Schmitt, W., **Synoptic meteorology of the Antarctic.** (In: **Meteorology of the Antarct** ed. by M. P. van Rooy. Pretoria, **1957.** p. 209–231. 21 figs., 14 tables.) **DWB**—T history of Southern Hemisphere synoptic analysis is reviewed, beginning with the daily synop series for the Indian Ocean to 46°S for 1861, prepared by CHARLES MELDRUM who founded t Met. Soc. of Mauritius in 1851. The maps for Jan. and Feb. 1861 (printed in Edinburg are available in the W.B. at Pretoria. They are based on an average of 100 ships reporti from S.E. Atlantic and Indian Ocean (0°–120°E) and on land stations in S. Africa and Ind Thirteen other series are listed and described in detail and analysis methods and problem synoptic features, anticyclones, case studies of 2 anticyclone and 3 cyclone series. Statistic data regarding depressions and cyclone tracks are also presented and analyzed. The Southe Hemisphere Project (daily 0600 charts with 450 land and 150 marine observations) is describe *Subject Headings:* **1. Antarctic synoptic meteorology 2. Southern Hemisphere Project (Sou Africa) 3. Antarctic weather analysis 4. Southern Hemisphere 5. Antarctica.**—*M.R.*

9.11–53 551.501.9(99) 551.465(26

†Taljaard, J. J., **Geographical and hydrological features of the Antarctic.** (In: **Meteorolo of the Antarctic,** ed. by M. P. van Rooy. Pretoria, **1957.** p. 1–15. 16 figs., 2 charts, refs **DWB**—The Antarctic is defined as the area S. of 50°S. including the continent of Antarctic but excluding the S. tip of S. America. The term Antarctic Ocean is used for the seas fro 50°S. to the Antarctic continent and the local names: Ross Sea, Weddell Sea or the Atlanti Pacific and Indian Sectors of the Antarctic Ocean. Shape, area, height, topography, t Antarctic convergence surface currents, west wind and east wind drift, pack ice, topograph around the island and continental meteorological stations (Marion Island, Kerguelen, Hear Macquarie, Auckland Islands, Campbell Island, Maudheim, Mawson, Queen Mary Lan Pointe Géologie, Port Martin, Cape Denison, Cape Adare and McMurdo Sound are describe and the topography shown on small charts. Large charts show: 1) Antarctic convergence an currents and 2) Pack ice limits at 3 seasons (*N*, mean and *S* limits). *Subject Heading* **1. Antarctic stations 2. Antarctic currents 3. Antarctic Ocean.**—*M.R.*

9.11–54 551.506.5:016(99

†Venter, R. J., **Sources of meteorological data for the Antarctic.** (In: **Meteorology of th Antarctic,** ed. by M. P. van Rooy. Pretoria, **1957.** p. 17–38. 6 figs., 3 charts, refs.) **DWB**— Observations dating back to 1772 are grouped into 4 chronological categories: 1) 1897 (1 expeditions), 2) 1897–1917 (17 expeditions), 3) 1918–38 (3 expeditions) and 4) 1939–56 (1 expeditions). The first period observations was mainly from log books or diaries, the secon from geographical expeditions with carefully tabulated data, the 3rd from whaling or ocean ographic voyages and the 4th from specific meteorological stations. The first meteorologica observations of lasting value were begun in 1839 (J. C. Ross Expedition, 1839–43). A sur prising amount of observational material is on punched cards at Pretoria (from whaling shi reports, etc.). The frequency (by year and by latitude and longitude square) of these ob servations (1920–55) is shown on charts, and the details of the material from the Antarcti and from the sub-Antarctic islands are given in extensive tables arranged both chronologicall and by Octants, and shown on several large folded diagrams. *Subject Headings:* **1. Antarcti expedition data inventories 2. Antarctica.**—*M.R.*

9.11–55 551.582.2(99

*†Vowinckel, E., **Climate of the Antarctica coast.** (In: **Meteorology of the Antarctic,** ed by M. P. van Rooy. Pretoria, **1957.** p. 137–152. 3 figs., 13 tables, 2 charts, refs.) **DWB**—

he hours of sunshine, radiation, cloud amount, temperature (means, ranges, frequency, urnal and interdiurnal changes, wind direction and speed frequencies, etc. for coastal stations Antarctica are analyzed and discussed with illustrative tables and graphs, and polar iso-ermal charts for Jan. and July. A series of frequency curves for Jan. and July temperatures 8 stations show the wide variation in spread of temperatures from place to place (Little erica has a very great range 55°C in July, whereas Port Martin has only 35°C; and in n. Cape Adare has a range of only 15°C). Sunshine and radiation are greatest in the interior, d are greater in the Antarctic than in tropical or Arctic regions. *Subject Headings:* **1. Climate Antarctic Coast 2. Antarctic Coast.**—*M.R.*

9.11–56 551.582.2(269)

*†Vowinckel, E., **Climate of the Antarctic Ocean.** (In: **Meteorology of the Antarctic,** ed. M. P. van Rooy. Pretoria, **1957.** p. 91–110. 13 figs., 9 tables, 6 charts, refs.) **DWB**—he data used in this article are taken from articles by the author, and a punched card deck 10,000 cards) for 1920–55 for the Antarctic Ocean S. of 50°S. The discussion and analysis vers: 1) Sea surface temperature (general distribution of temperatures, the isothermal belt, e Antarctic convergence zone); 2) Air temperature (the quasi-isothermal belt, the polar ont zone, secular variations); 3) Wind (general areal distribution, longitudinal differences 0°W. to 60°E. and 40°–160°E.) and 4) Cloudiness. Large charts show mean sea and air mperature, resultant winds, cloud amount, frequency of stratiform and cumuliform clouds southern summer. *Subject Headings:* **1. Climate of Antarctic Ocean 2. Sea surface tem-eratures 3. Antarctic Ocean.**—*M.R.*

9.11–57 551.510.535(946)

*Cohen, D. S., **Hourly measurements of ionospheric characteristics, Macquarie Island, 950.** *Australian National Antarctic Research Expedition,* 1947–1949, *Interim Reports,* No. 2, March **1952.** 81 p. Mostly tables. **DLC** (QC973.C6)—Using equipment of the CSIRO adiophysics Lab., routine h′F ionospheric soundings have been made at Macquarie Island 54°29′S., 158°58′E.; geomag. 61°S., 243°E.) since June 13, 1950. In this report, hourly alues for June to Dec. 1950 are published for $f°F_2$, $f°F_1$, $f°E$, fE_s, $h'F_2$, hpF_2, $h'F_1$, $h'E$, $h'E_s$, (M3000) F_2, (M3000) F_1. *Subject Headings:* **1. Ionospheric sounding data 2. Macquarie sland, S. Pacific.**—*M.R.*

9.11–58 551.513(99) 551.510.528(99)

*Rastorguev, Vladimir I. (*Main Admin. North Sea Route, U.S.S.R.*) and Alvarez, José A. *Argentine Navy*), **Description of the Antarctic circulation observed from April to November 957 at the IGY Antarctic Weather Central Little America Station.** *International Geophysical Year,* 1957/1958. *IGY World Data Center A (National Academy of Sciences, Wash., D. C.), IGY General Report Series,* No. 1, May 16, **1958.** 10 p. 59 figs., 10 refs. **DWB**—Charts of monthly mean 700, 500, 300 mb circulation, tracks of surface cyclones and anticyclones, tracks f 700 mb cyclones, number of lows in a given square (240×600 mm) and tropopause tem-erature and pressure for the area S. of 50°S. lat. for April–Nov. 1957 are presented and dis-ussed. The data were compiled from 8 months of 700, 500 and 300 mb charts (700 mb is onsidered representative of the conditions over the high land mass of Antarctica). Periods hen there was no tropopause were rare. The mean pressure charts are characterized by ultiple (two or more) centers in most months. *Subject Headings:* **1. Antarctic circulation harts 2. Antarctic tropopause charts 3. Cyclone tracks 4. Antarctica.**—*M.R.*

9.11–59 551.506.5:551.578.4

†*Schytt, Valter, **Snow studies at Maudheim.** *Norwegian-British-Swedish Antarctic Ex-edition,* 1949–1952, *Scientific Results,* Vol. 4 (Glaciology II), Pt. A, issued by Norsk Polar-nstituut, **1957.** p. 5–63. 14 figs., 3 plates, 11 tables. Also his: **Snow studies inland.** *Ibid.,* B, p. 65–112. 6 plates, 43 figs., 5 tables, 65 refs. And his: **The inner structure of the ice helf at Maudheim as shown by core drilling.** *Ibid.,* 4 C, p. 113–148. 8 plates, 45 figs., tables, 36 refs. **DWB**—Stratification studies in the Arctic since 1873 (Nordenskiold, Hansen, Peter Freuchen, de Quervain, Koch-Wegener) and in the Antarctic (Wilkes,

1845; ARCTOWSKI, 1901–8), etc. and recent WEGENER, AHLMANN, SVERDRUP, BYRD a... ETIENNE investigations (1929–1949) are summarized in detail and the present Maudhe... (1950–52) studies including climatic data (temp., sunshine, wind and precip.) and data o... tained from a pit on Sept. 30, 1950 and a deep pit in July–Sept. 1951 analyzed in Pt. A. Pt. B the results of 45 pit measurements (from 1 m to >3 m deep), during Dec. 1950–Mar... 1951 at different elevations from sea level to 2500 m height, and to 350 km inland are describ... and each sounding illustrated by a cross sectional drawing. Data are given in great deta... and the results analyzed and synthesized in terms of density variations during individual pa... years, and in terms of height above sea level. Stratification study of an iceberg just off t... coast of Maudheim is also included and compared with pit measurements at Maudheim, th... extending the Maudheim accumulation record back to 1924. The mean annual accumulatio... from 1924–1934 was 37.9 cm of water and from 1935–51 it was 36.5 cm. Pt. C covers t... inner structure of the shelf ice at Maudheim by machine core drilling to 100 m depth, densit... variations with depth, crystallographic studies, observations of air bubbles, and a diagram ... the ice shelf at 70 m depth. The local accumulation of snow or firn gives way to ice of inlan... origin which is 120 m deep. Ideas of temp. and wind conditions can be obtained from densit... studies of former years accumulations. *Subject Headings:* **1. Snow studies, Maudhei... 2. Maudheim, Antarctica. I. Norwegian British-Swedish Antarctic Expedition, 1949–195...** —*M.R.*

SOCIETIES AND SERVICES

See also: **Cooperative radio observers, Kazakh S.S.R.** (Porfir'ev), 9.11–90; **Hydromet. service to migratory herdsmen** (Vishnenko), 9.11–91; **Fire weather services, Oregon, U. S.,** 9.11–96.

9.11–60 551.5:061.2(764...

Deep in the heart of Texas. *American Meteorological Society, Bulletin,* 37(8):431–43... Oct. **1956. DWB**—The two local branches of the American Meteorological Society in Texas—... the Central Texas Branch and the College Station Branch—are discussed at some length... The former was started in 1948 and the latter in 1953. Prominent speakers, speeches, officers... conferences and other activities of the two Branches are enumerated. *Subject Headings:* **1. Meteorological society branches 2. American Meteorological Society, Texas Branch...** —*M.R.*

9.11–61 531.5:351.85...

Truman, Harry S., **Weatherman Truman greets the AMS.** *Weatherwise,* Boston, 10(3)... 75, June **1957. DWB**—Cover shows Ex-President HARRY S. TRUMAN in his Library looking... at the daily weather map (which he gets by air mail from Washington) and publications on... weather, along with CAPT. ORVILLE, BOB FLETCHER, KEN SPENGLER and EDMOND JACOBSON... of Kansas City. TRUMAN states that his interest in weather dates back to 1906 or earlier... Random but pertinent remarks on the usefulness of forecasts during the second World War... on the difficulty of forecasting, on the changeability of weather in the Mississippi Valley, etc.,... are included. *Subject Headings:* **1. Public relations 2. American Meteorological Society... 3. Truman, Harry S.**—*M.R.*

CONFERENCES

9.11–62 551.574.1:061.3...

Une conférence sur les bases scientifiques des recherches sur la modification du temps... [A conference on the scientific bases of research on weather modification.] *Puy de Dôme... Observatoire, Bulletin,* Ser. 2, No. 1:20, Jan./March **1956. DWB**—Brief note on the conference... organized by the Institute of Atmospheric Physics of the University of Arizona at Tucson... on April 10–12, 1956. The conference was broadened to include all aspects of weather modi-... fication as well as cloud modification. Thanks to the Rockefeller Foundation, scientists from... Australia, Mexico, France, Israel, Canada, Japan, England, Sweden and Switzerland were... able to attend. *Subject Headings:* **1. Cloud Physics Conference, Tucson, April 1956 2. Con-... ferences.**—*M.R.*

EDUCATION, HISTORY AND BIOGRAPHY

HISTORY

See: **Hist. of U. S. W. B.** (Hartwell), 9.11–36; **Hist. of upper air sounding** (Veidner), 9.11–127; **Hist. of earth's atmos.** (Kuiper), 9.11–144.

BIOGRAPHY

See also: **Biog. of P. I. Brounov, 9.11–2.**

9.11–63 551.5:92

Thorp, J. R., [**Biographical sketch of**] **Rear Admiral Sir Francis Beaufort, K.C.B., D.C.L., F.R.S.** *Weather*, London, 12(12):384, Dec. **1957. DWB, DLC**—Brief biography of SIR FRANCIS BEAUFORT who died Dec. 1957. He was hydrographer of the Royal Navy from 1829 to 1855 and his scale was adopted by the Navy in 1838. Born in Collon, Ireland in 1774, son of REV. DANIEL AUGUSTUS BEAUFORT, he entered the Navy in 1787, served in several sea battles, established a telegraph line from Dublin to Galway in 1803–4, commanded a survey expedition to the River Plate in 1805 and gave out his first wind force scale in 1806. Surveyed Greek Archipelago, Syria and Lebanon coasts in 1806–12. Retired in 1812 because of battle wounds. Wrote history of Karamania, pub. 1816. Kept meticulous weather records for years. *Subject Headings:* **1. Biography of Francis Beaufort 2. Beaufort, Francis.**—*M.R.*

9.11–64 551.5:92

Glasspoole, J., [**Obituary of**] **Charles Ernest Pelham Brooks, I.S.O., D.Sc.** *Meteorological Magazine*, London, 87(1030):97–98, April **1958.** Also: Goldie, A. H. R., [**Obituary notice of**] **C. E. P. Brooks.** *Royal Meteorological Society, Quarterly Journal*, 84(360):202–203, April **1958.** Also: **Dr. C. E. P. Brooks, I.S.O.-1888–1957.** *Journal of Glaciology*, 3(24):322, Oct. **1958. DWB, DLC**—Among other things, it is mentioned that C. E. P. BROOKS was editor of the **Meteorological Magazine** for 22 yrs, and that he received the Buchan Prize of the Royal Meteorological Society in 1931. His work as a climatologist and librarian is emphasized. He was secretary of the Royal Meteorological Society from 1928–32 and later Vice President. Details of career in Meteorological Office, of his work with WMO technical commissions, his most significant contributions, books, monographs and events of his private life are recounted. *Subject Headings:* **1. Obituary of C. E. P. Brooks 2. Brooks, C. E. P.**—*M.R.*

9.11–65 551.5:92

Houghton, H. G., [**Obituary note on**] **Charles Franklin Brooks, 1891–1958.** *American Meteorological Society, Bulletin*, 39(3):155, March **1958.** photo. **DWB, DLC.** Also his: [**Obituary of**] **Prof. Charles F. Brooks.** *Nature*, London, 181(4621):1440, May 24, **1958. DWB.** Also: Stone, R. G., [**Obituary of**] **Charles F. Brooks.** *Geographical Review*, 48(3): 443–444, July **1958. DLC**—CHARLES F. BROOKS founded and kept the American Meteorological Society going, almost single-handedly, during the first critical 25 yrs of its existence. He served as secretary for 35 yrs and Editor of the **Bulletin** for 16 yrs. He also served as director of Harvard's Blue Hill Observatory for 26 yrs, was editor of the **Monthly Weather Review** and prof. at Clark Univ. He helped establish the Mt. Washington Observatory, was a world renowned expert on cloud forms, helped produce the new **International Cloud Atlas of the WMO,** published a book, **Why the Weather,** and had a column and radio program of the same name. *Subject Headings:* **1. Obituary of Charles F. Brooks 2. Brooks, Charles F.**—*M.R.*

9.11–66 551.5:92

Forsdyke, A. G., [**Obituary note on**] **Dr. J. S. Farquharson.** *Weather*, London, 13(3):96–97, March **1958.** photo. **DWB.** Also: Peters, S. P., [**Obituary of**] **James Strachan Farquharson.** *Meteorological Magazine*, London, 87(1030):119–120, April **1958.** Also: Veryard, R. G., [**Obituary of**] **Dr. J. S. Farquharson.** *Nature*, London, 181(4626):1766, June 28, **1958. DWB, DLC**—DR. J. S. FARQUHARSON (born June 30, 1904) was killed in an auto accident in a thick fog on Jan. 31, 1958. He was Honorary Treasurer of the Royal Meteorological Society from 1952 until his death. He had served in the Meteorological Office since 1925 (at Lerwick,

Croydon Airport, Khartoum, Paris, Iraq, India and Dunstable and Kingsway). The obitua by PETERS mentions that he was educated at Gordon's College and Aberdeen Univ. where received the D.Sc. in 1944. *Subject Headings:* **1. Obituary of J. S. Farquharson 2. Farq harson, James Strachan.**—*M.R.*

9.11–67 551.5:

Tait, J. B., [**Obituary of**] **Prof. Bjørn Helland-Hansen.** *Nature*, London, 181(4607):45 454, Feb. 15, **1958. DWB, DLC**—Born in Oslo Oct. 16, 1877—studied under V. BJERKN and was associated with V. W. EKMAN, MARTIN KNUDSON, and FRIDTJOF NANSEN. In 19 he developed the method for dynamic computation of ocean currents. Advocated foundi of Geophysical Institute at Bergen in 1917. Professor of Oceanography and head of th Institute until 1946. President for 25 yrs of Christian Michelsen Institute of Science an Intellectual Freedom and President of International Union of Geodesy and Geophysics i 1945–8, and the International Association of Physical Oceanography 1936–9. *Subject Hea ings:* **1. Obituary of Bjørn Helland-Hansen 2. Helland-Hansen, Bjørn.**—*M.R.*

9.11–68 551.5:9

Wood, Walter A., [**Obituary note on**] **Richard Carleton Hubley, 1926–1957.** *Journ of Glaciology*, Cambridge, 3(23):227, March **1958. DWB, DLC**—Born June 1, 1926 at Tacoma Washington, R. C. HUBLEY studied at the Univ. of Wash. under PHIL CHURCH (1946–1950 and later earned his Ph.D. (1952–57). He worked in the fields of micrometeorology an glaciology, and in 1953–54 he served as glaciologist of Juneau Ice Field Research, a projec of the American Geographical Society and of the Blue Glacier of the Olympic Mts. (Arcti Institute). Finally, he was coordinator of the U. S. glaciological program of IGY, and o IGY expedition to McCall Glacier. *Subject Headings:* **1. Obituary of R. C. Hubley 2. Hubley R. C.**—*M.R.*

9.11–69 551.5:92

Byers, Horace R., [**Obituary note on**] **Carl-Gustaf Arvid Rossby 1898–1957.** *American Meteorological Society, Bulletin*, 39(2):98–100, Feb. **1958. DWB, DLC.** Also: Bilancini, Raoul, [**Obituary note on**] **Carl Gustaf Rossby.** *Rivista di Meteorologia Aeronautica*, Rome, 18(2):72–73, April/June **1958.** Also: Hansen, W., [**Obituary of**] **Carl Gustav Rossby.** *Naturwissenschaften*, Berlin, 45(8):15, April 15, **1958.** Also: Dési, Frigyes, [**Obituary note on**] **C. G. Rossby, 1898–1957.** *Időjárás*, 61(6):461–462, Nov./Dec. **1957.** In Hungarian, English trans. p. 474–475. **DLC.** Also: [**Obituary note on**] **Carl-Gustaf Arvid Rossby.** *Meteorologiia i Gidrologiia*, No. 10:56–57, Oct. **1957.**—The first article gives personal recollections of the career of DR. ROSSBY, especially that since coming to the U. S. in 1925, as remembered by one of his closest associates and his successor as Prof. of Meteorology at the Univ. of Chicago. DR. ROSSBY was born in Stockholm on Dec. 28, 1898 and died on Aug. 19, 1957 at the age of 58, and at the height of his very active career. He established the Dept. of Meteorology at MIT and Chicago and the Institute of Meteorology at Stockholm Univ. He was instrumental in establishing the *A.M.S. Journal of Meteorology* and *Tellus*. The other obituaries give similar information. *Subject Headings:* **1. Obituary of Carl-G. A. Rossby 2. Rossby, Carl-G. A.**—*M.R.*

9.11–70 551.5:92

Mosby, H., [**Obituary of**] **Harald Ulrik Sverdrup.** *Tellus*, Stockholm, 9(4):429–431, Nov. **1957.** photo. **DWB.** Also: Sager, G., **In Memoriam: Prof. Dr. Harald Ulrik Sverdrup [including a list of Sverdrup's principal works].** *Zeitschrift für Meteorologie*, Berlin, 11(9):257–260, Sept. **1957.** 40 refs. **DWB, DLC.** Also: Hansen, W., [**Obituary of**] **Harald U. Sverdrup.** *Naturwissenschaften*, Berlin, 45(8):15, April **1958.** Also: Kakas, J.: [**Obituary note on**] **H. U. Sverdrup, 1888–1957.** *Időjárás*, 61(6):462, Nov./Dec. **1957.** In Hungarian, English trans. p. 475. **DLC.** Also: Isachsen F., [**Obituary of**] **Harald Ulrik Sverdrup.** *Società Geografica Italiana, Bolletino*, 11(4/5):161–163, April/May, **1958.**—The first article is an eloquent tribute to DR. SVERDRUP who died suddenly on Aug. 21, 1957 at the age of 69. Born Nov. 15, 1888 at Sogndal, West Norway, he worked with V. BJERKNES from 1911–1917 at Oslo and Leipzig; leader of scientific work on "Maud," 1917–1925; published results in meteor-

ogy, magnetism, aurora, atmospheric electricity, tides, currents, water masses, sea-ice, marine geology, astronomy and zoology. Director of Scripps Inst. of Oceanography 1936–48 and Norwegian Polar Institute 1949–57. Among his many achievements was his collaboration in 1931 with SIR HUBERT WILKINS in the attempt to reach the North Pole with the submarine "Nautilus." The other obituaries give similar information. *Subject Headings:* **1. Obituary of H. U. Sverdrup 2. Sverdrup, H. U.**—*M.R., I.L.D.*

BIBLIOGRAPHY

9.11–71 551.5:63:016

†Germany. Deutscher Wetterdienst, **Agrarmeteorologische Bibliographie.** [Agrometeorological bibliography], **1956.** Its *Bibliographien*, No. 8, pub. **1958.** Comp. by Max Schneider. 119 p. **DWB, DLC**—A systematic compilation of 972 references (and abstracts) of literature received during 1956, in the many branches of agricultural meteorology. A list of serials and an author index are included. Previous compilations have been run in *MAB*, 4.3–196, March 1953, 6.11–50, Nov. 1955 and 7.11–58, Nov. 1956. *Subject Heading:* **1. Agrometeorology bibliographies. I. Schneider, Max** (*comp.*).—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

OCEANOGRAPHY AND MARINE METEOROLOGY

See also: **Antarctic met. stations & currents** (Taljaard), 9.11–53; **Climate, Antarctic Ocean** (Vowinckel), 9.11–56; **Obituary of H. U. Sverdrup** (Byers), 9.11–70; **Visibility observation at sea** (Williams), 9.11–293.

9.11–72 551.506.5(931)

†Knox, G. A. (*Biology Dept., Canterbury Univ., College, Christchurch*), **General account of the Chatham Islands 1954 Expedition.** *New Zealand. Dept. of Scientific and Industrial Research, Bulletin*, No. 122, **1957.** 37 p. table, 24 figs., 28 refs. chart in pocket. Stamped in half-title p.: N. Z. Oceanographic Institute, Memoirs, 2, Wellington, New Zealand. **DWB** M06.5/931 K74ge)—The purpose of this expedition was to study the Chatham Rise—a seasonal floor feature <300 fathoms deep in lat. 43°–44°S. and 175° to 176°30′E. (east of N. Zealand). A series of stations were occupied between Banks Peninsula and Chatham Islands to get temperatures, water samples, sediment and bottom fauna, depths, etc. Hydrology is discussed on p. 11 and 18–27, equipment on p. 13–14; meteorological data at 60 stations (Jan. 23–28, 1954) include wind, swell, air temperature and depth temperature and salinity data. *Subject Headings:* **1. Chatham Islands Expedition, 1954 2. Oceanographic surveys 3. Meteorological data 4. Chatham Rise, Southwest Pacific.**—*M.R.*

9.11–73 551.465:551.556.8(213)

Hidaka, Koji (*Geoph. Inst., Tokyo Univ.*), **Why are the thermocline and the sea surface horizontal at the equator?** *Records of Oceanographic Works in Japan*, Tokyo, n.s., 2(2):1–7, Oct. **1955.** fig., 9 refs., 30 eqs. **DWB**—Extending the work of EKMAN (1905) on the relation between wind stresses and the pressure field in the sea, integral equations are solved to show the state of the sea surface and thermocline near the equator, assuming a two layer zonal ocean with no continents or islands and no variation in east-west motion of the water. It is concluded that the sea surface is horizontal and has no meridional slope at the equator, and the thermocline is also horizontal and has no meridional slope. *Subject Headings:* **1. Wind effects on water surfaces 2. Equatorial ocean surface.**—*M.R.*

9.11–74 551.46:551.506(26)

*U. S. Hydrographic Office, **Weather, waves, and radiation observations.** Its *H.O. Publication*, No. 617-H, Feb. **1955.** 287 p. charts, almost entirely tables. On t-p: U.S.S. Rehoboth, Cruise 8, winter 1951; Cruise 9, summer 1951; Cruise 10, winter 1952; Cruise 12, winter 1953; Cruise 13, summer 1953. **DWB**—Hourly observations of surface wind, temperature, wet bulb, sea surface temperature, pressure, weather, visibility, ceiling, sky cover, clouds, fog wave direction, speed and height, and (for the daylight hours) radiation (incident

and reflected sun and sky radiation from Eppley pyrheliometer record). In all, hourly da were obtained for 267 days and radiation data for 229 days (pyrheliometer was not operati on cruise 11). A chart shows route of each separate cruise. Areas covered included t North Atlantic and Norwegian Seas, the North Sea, and the Mediterranean. Data a printed from IBM cards. Codes, etc. are appended. *Subject Headings:* **1. Oceanograph cruise observations 2. Radiation measurements at sea 3. U.S.S. "Rehoboth" cruis 4. North Atlantic 5. Mediterranean 6. North Sea.**—*M.R.*

9.11–75 551.46:532.

*Jasper, N. H., **Statistical distribution patterns of ocean waves and of wave-induced sh stresses and motions, with engineering applications.** *U. S. David Taylor Model Basin, Repo* No. 921, Oct. **1957.** 59 p. 23 refs., 21 figs. "Reprint of paper pub. in *Society of Na Architects and Marine Engineers, Transactions*, Vol. 64, **1956.**" **DWB** (532.59 J39st)—Da from a number of sources for 3 to 8 months (tanker "Esso Ashendle," cargo vessels "Goph Marines" and "Ocean Vulcan," destroyer escort U.S.S. "Fessenden," U.S.C.G.C. "Unimak a 900 ft aircraft carrier and a 380 ft aircraft carrier) are used to determine the probabili distributions of wave height, wave length, pitch, roll and heave motions and stresses under wide range of operating conditions. It is shown (graphically and in tables) that these compl factors can be predicted by statistical means. It is also shown that the wave and stre distributions can be represented by the Rayleigh One-parameter distribution, and that over wide range of conditions a weighted 2-parameter log. normal distribution (summation of large number of Rayleigh distributions), whereas over a period of several years (e.g., 6 y at N. Atlantic stations) by a log-normal distribution. *Subject Headings:* **1. Ocean wav distribution data 2. Ship stresses due to waves 3. Statistical ocean wave analysis 4. Nor Atlantic.**—*M.R.*

9.11–76 550.371:551.4

Deacon, G. E. R., **Information from electric currents in the sea.** *Institute of Navigatio London, Journal*, 8(2):117–120, April **1955.** fig., 7 refs. **DWB**—Moving water in the earth magnetic field produces measurable electric currents. The von Arx apparatus for towin behind a ship is described and a trace obtained by "Discovery II" illustrated. *Subject Hea ings:* **1. Geoelectric field 2. Current meters.**—*C.E.P.B.*

9.11–77 551.556.8:551.4

Barlow, John P. (*Dept. of Conservation, Cornell Univ., Ithaca*), **Effect of wind on th salinity distribution in an estuary.** *Journal of Marine Research*, New Haven, Conn., 15(3):19 203, **1956.** 4 figs., 4 tables, 6 refs. **DWB, DLC**—The distribution of salinity in a small tid estuary (Great Pond) through a period of over a year is described. The numerous importan variations in salinity, both seasonal and short-term, cannot be attributed to tides or to day-t day changes in the supply of fresh water. It is shown that they are related to day-to-da changes in wind forces and direction and that the general seasonal change in average salinit is related to a general seasonal change in prevailing winds. *Subject Headings:* **1. Wind effect on salinity of rivers 2. Salinity distribution.**—*Author's abstract.*

9.11–78 551.510.4:546.3

Shuleĭkin, V. V. and Shakurov, P. F., **Liniia natriia v spektre pogloshcheniia vozdukh nad morem.** [Sodium lines in the absorption spectrum of air over the sea.] *Akademiia Nau SSSR, Doklady*, 106(6):991–993, Feb. 21, **1956.** 2 figs., 3 refs., 7 eqs. **DWB, DLC**—Th technique for studying the sodium line in the spectrum of atmospheric absorption at a heigh of 50 m to 10 km over the sea surface is described and equations are developed for determinin the number of excited atoms of sodium in 1 cm^3 of air over the sea surface. *Subject Heading* **1. Sodium in atmosphere over ocean.**—*I.L.D.*

9.11–79 621.396.96:621.396.11:551.4

Court, G. W. G., **Determination of the reflection coefficient of the sea, for radar-coverag calculation, by an optical analogy method.** *Institution of Electrical Engineers, London, Pro ceedings, Pt. B*, 102(6):827–830, Nov. **1955.** 6 figs., table, 4 refs. **DLC**—An approach to th

lution of the problem of the effect of a rough sea surface on the vertical coverage of a radar , by means of an optical analogy, is suggested. The reflection of light waves by a ground- ss surface is considered, and the results of optical experiments are applied to the case of dio waves reflected by the surface of the sea. The method does not yield a precise solution the problem, but the result achieved does not conflict seriously with practical results which ve been recorded up to the present. A typical coverage diagram derived by this method is ven to show the effect on the coverage of the variation of sea-surface condition as indicated the sea-state scale. *Subject Headings:* **1. Radar reflection from sea 2. Radar coverage.**—*uthor's abstract.*

9.11–80 551.46:551.511:531.51

Reid, R. O. and Kajiura, K., **On the damping of gravity waves over a permeable sea bed.** *merican Geophysical Union, Transactions,* 38(5):662–666, Oct. **1957.** 3 figs., 4 refs., 34 eqs. **WB, DLC**—The problem of damping of gravity waves over a permeable sea bed of great pth is re-examined, using a more rigorous approach than that employed by PUTNAM in 1949. is found that PUTNAM's approximate method of analysis is justified in view of the smallness the permeability factors commonly encountered. However, a misinterpretation error was scovered in PUTNAM's paper which makes his dissipation function too great by a factor of four. *ubject Heading:* **1. Gravity wave analysis.**—*Authors' abstract.*

9.11–81 551.46:551.3.051

Kullenberg, B. (*Oceanog. Inst., Göteborg*), **Absolute chronology of deep-sea sediments nd the deposition of clay on the ocean floor.** *Tellus,* Stockholm, 5(3):302–305, Aug. **1953.** tables, 12 refs. **DLC**—An absolute chronology of deep-sea sediments on the basis of the ccumulation of TiO_2, presupposes the rate of accumulation of clay to be tolerably constant ith regard to time. It is here asserted that this condition is not fulfilled, because 1) the supply fine terrigeneous matter of offshore waters will be appreciably affected by climatic changes, the total amount of fine terrigeneous matter carried in suspension by sea water is deposited about 300 yrs, which is a small fraction of a climatic cycle, and, consequently, 3) the amount fine terrigeneous matter present in the sea is insufficient to act as a buffer against the varia- ons of the supply, on account of which these variations will be reflected by almost equally reat variations of the rate of accumulation. *Subject Heading:* **1. Oceanic sediments.**—*Author's bstract.*

9.11–82 539.16:546.26:546.264

Brannon, H. R., Jr.; Daughtry, A. C.; Perry, D.; Whitaker, W. W. and Williams, M., **adiocarbon evidence on the dilution of atmospheric and oceanic carbon by carbon from fossil uels.** *American Geophysical Union, Transactions,* 38(5):643–650, Oct. **1957.** 2 figs., 4 ables, 16 refs., 8 eqs. **DWB, DLC**—The dilution of atmospheric carbon dioxide by carbon ioxide from fossil fuels is estimated to be about 3½%, on the basis of radiocarbon assays of ee rings of known ages from several trees of different genera, after allowance has been made r effects attributable to ecological differences. The cumulative mass of fossil carbon dioxide eleased to the atmosphere is 3.3×10^{17} gm, equivalent to about 14% of the carbon dioxide the atmosphere. Based on these data, the fractional part of the atmospheric carbon dioxide hich enters the ocean each year is estimated to be 0.062. Radiocarbon assays of several ineteenth-century marine shells and of their modern counterparts indicate a one to two per- ent dilution of shallow oceanic carbonates by carbon dioxide from fossil fuels. Use of these ata in a simplified mathematical model of atmosphere-ocean, yields information on mixing mes of the ocean. *Subject Headings:* **1. Radiocarbon distribution 2. Ocean-atmosphere arbon dioxide exchange 3. Carbon dioxide in fossil fuels.**—*Authors' abstract.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

See also: **Rockets & space ships** (Ley), 9.11–37; **IGY rocket program** (Spencer), 9.11–40.

9.11–83 551.507.362.2

Le Claire, R., **Le vol interplanétaire.** [The interplanetary flights.] *Schweizer Aéro- evue,* Berne, 33(2):68–70, **1958.** 3 figs. **DLC**—The launching of artificial satellites allows

us to believe that interplanetary flights will become a reality in the rather near future. The author enumerates the various difficulties to be overcome so as to make interplanetary flig possible. *Subject Heading:* **1. Satellite observatories.**—*A. V.*

9.11–84 551.510.3 :551.507.36

Sterne, T. E. and Schilling, G. F. (*both, Astrophysical Obs.*), **Some preliminary values upper atmosphere density from observations of U.S.S.R. satellites.** *Smithsonian Institut Astrophysical Observatory, IGY Project No. 30.10, Special Report*, No. 3, Nov. 15, **1957.** 1(14 refs. **DWB** (629.1388 S661so). Also issued in "edited form" as *Smithsonian Contributi to Astrophysics*, Wash., D. C., 2(10):207–210, **1958. DWB, DLC**—On the basis of availal orbital data for the U.S.S.R. Satellites 1957 Alpha One, Alpha Two, and Beta One, prelimina values of atmospheric density have been calculated for the respective perigee altitudes. T computations necessarily involve a number of speculative assumptions with regard to ma area ratios, but the results show a reasonable consistency in numerical values derived from t three satellites independently. It would appear that the atmospheric density at altitud between 220 km and 230 km is somewhat higher than has often been assumed. While t values derived here must be considered as being of an extremely tentative nature, it is e pected that similar methods of calculation will, in the future, permit the inference of atm pheric density over a wide range of altitudes from orbital data. *Subject Headings:* **1. Satell observations 2. Air density calculations.**—*Authors' abstract.*

9.11–85 551.5 :629.

†Due Rojo, Antonio (*Observatorio de Cartuja*), **El automatismo en meteorología.** [Autom tion in meteorology.] *Revista de Geofísica*, Madrid, 15(57):65–78, Jan./March **1956.** 11 re Also his: **Algunos problemas prácticos en los satélites artificiales.** [Some practical proble of artificial satellites.] *Ibid.*, 15(60):449–457, Oct./Dec. **1956.** 8 refs. **DWB**—A gre number of ways in which automation will facilitate progress in meteorology along the 3 lin laid out by F. W. Reichelderfer, Chief of the U.S.W.B., namely in: 1) collection of dat 2) analysis of data and 3) dissemination of results obtained, are reviewed. Among these a the development of automatic weather stations, radiosondes, rockets, satellites, sferics r corders, radar observations of storms, ionospheric soundings by radio, radiation balance mete numerical prediction studies of general circulation, hurricane or severe storm warning, facsimi transmission, punched card compilation, etc. Most examples given are from U. S. literatur In the supplementary paper, the author sums up (mostly from U. S. sources) recent develo ments and considerations connected with propulsion, guidance, scientific measurement a retrieval problems of artificial earth satellites and space ships. *Subject Headings:* **1. Autom tion in meteorology 2. Advances in meteorology 3. Satellite development.**—*M.R., G.T.*

GEOMAGNETISM

See: **Special bibliography on Geomagnetism,** p. 1430.

AERONAUTICAL METEOROLOGY

See also: **Aviation aspects of mt. waves** (Alaka), 9.11–14; **Aircraft obs. of cirrus height frequencies** (Clodman), 9.11–243; **Flying weather, Japan** (Yamada, Sakai), 9.11–289.

9.11–86 551.541 :551.524.7 :551.555.

Kuettner, J. (*Geophysics Res. Directorate, Cambridge, Mass.*), **The rotor flow in the lee o mountains.** *Schweizer Aero-Revue*, Berne, 33(4):208–215, April **1958.** 12 figs., 16 refs 15 eqs. **DLC**—After a description of the rotor phenomenon, an attempt is made to explai it by the hypothesis of the "heated pressure jump." The simple hydraulic jump theory although very attractive in many respects, fails to account for the fact that the height of th roll cloud frequently exceeds that of the cap cloud ("Föhnmauer") and that the mountai wave generally reaches its most intense state in the early afternoon hours. Measurement made during the Sierra Wave Project in California show the effects of rapid ground heatin near the foot of the mountain which reduces the inversion on top of the ground layer throug turbulent mixing. This removes part of the gravitational constraint on the air mass bouncin

wards in the hydraulic jump. Heating rates of 1°C per 2 mi ground path and reduction the inversion by 50% are observed. If the jump is moderately high, part of the energy is lliated away in a wave system ("undulatory jump"). If the jump is intense, up to 50% the kinetic energy is transformed into turbulence ("breaking jump"). A diagram is given m which the height of the rotor can be estimated. The "breaking jump" seems to be ntical with the most hazardous type of rotor. High cap cloud and strong heating tend to ate dangerous conditions. This study supports the opinion of many glider pilots that the or flow plays a primary role in the development of the mountain wave, in contrast to many sting theories. *Subject Headings:* **1. Orographic waves 2. Inversions 3. Föhn.**—*Author's stract.*

9.11–87 551.506.7:551.524.7:629.13

Tolefson, H. B. (*Langley Aeronautical Lab., Langley Field, Va.*), **Atmospheric temperature servations to 100,000 feet for several climatological regions of the Northern Hemisphere.** *S. National Advisory Committee for Aeronautics, Technical Note*, 4169, Nov. **1957.** 26 p. ., tables, 7 refs. **DLC**—Radiosonde measurements of upper air temperatures taken over a yr period at nine stations in the Northern Hemisphere are summarized in tabular form in rder to provide information on the temperatures likely to be encountered during airplane and ssile operations up to 100,000 ft. The results indicate that the scatter in the temperatures out the mean generally decreased with increasing altitude from the tropopause to 100,000 ft. ttle, if any, effect of location upon the temperature was apparent for altitudes above approx. ,000 ft. *Subject Headings:* **1. Upper air temperatures 2. Radiosonde observations Stratospheric temperatures 4. Airplane and missile flights 5. Northern Hemisphere.** *NACA abstract.*

9.11–88 551.558.1:629.13

Tolefson, H. B., **An investigation of vertical-wind-shear intensities from balloon soundings r application to airplane and missile-response problems.** *U. S. National Advisory Committee r Aeronautics, Technical Note*, No. 3732, July **1956.** 33 p. 7 figs., 2 tables, 10 refs., 9 eqs. **WB, DLC**—The daily upper wind soundings taken at one station for a one-year period are alyzed to obtain data on the vertical wind shear intensities and frequencies for use in airplane- id missile-response studies. The results indicated maximum shear intensities of about 100 m r sec per km occurring at altitudes from 10 to 15 km during the winter and spring months. he application of these results to the calculation of the normal response of a missile in vertical ght is also considered briefly. *Subject Headings:* **1. Vertical wind shear intensities 2. Upper r wind observations 3. Airplane and missile flights.**—*NACA abstract.*

9.11–89 551.5:629.13

Polar service prospects. *The Aeroplane*, London, 83(2159):757, Dec. 5, **1952.** chart. **LC**—In connection with the flight of S.A.S. DC-6B "Arild Viking" from San Francisco to openhagen in Nov. 1952, some features of commercial polar flight are discussed, including nsiderations of polar climate. Weather near Thule Airport, Greenland, is considered to be ceptionally favorable, with generally westerly 20–25 kn winds above 25,000 ft and about kn northwesterlies at lower altitudes. Wind speed and direction at other points of the ght, clouds and temperature are also mentioned. *Subject Headings:* **1. Commercial polar ghts 2. Wind speed data 3. Thule Airport, Greenland.**—*G.T.*

AGRICULTURAL METEOROLOGY

See also: **Plant chemistry and climate** (Sharapov), 9.11–10; **Agromet. bibliogs., Max Schneider** (comp.), 9.11–71; **Low humidity effects on wheat** (Tsuberbiller, Krasnitskiĭ), 9.11–227; **Microclimate of an alfalfa field** (Akhmedov), 9.11–281; **Wheat field microclimate** (Maruyama), 9.11–282; **Soybean culture** (Abe, Takahashi), 9.11–283.

9.11–90 551.501.9

Porfir'ev, I. F., **Opyt raboty radiokorrespondentov Kazakhstana po obsluzhivaniiu otgonogo zhivotnovodstva.** [Radio co-operative observers of Kazakhstan provide service to gratory herdsmen.] *Meteorologiia i Gidrologiia*, No. 12:41–43, Dec. **1956.** fig. (map).

DWB, DLC—In order to provide weather reports to the migratory cattle industry of Kazakh SSR, particularly in the summer pasture lands, the Kazakh Hydrometeorolog Service organized, with the cooperation of the Ministry of Communications, a network of r co-operative observers. A map shows the network of hydrometeorological stations provid service to the migratory cattle raisers. The operation of the service, the type and tim observations, the communication of weather information, the nature of the information, are described. *Subject Headings:* **1. Cooperative observers 2. Cattle raising 3. Kazakh S** —*I.L.D.*

9.11–91 551.5:061:6

Vishnenko, A. S., **Opyt gidrometeorologicheskogo obsluzhivaniia otgonnogo zhi novodstva pri peregonakh skota cherez gornye perevaly.** [An experiment in hydrometeo logical services to migratory herdsmen driving cattle through mountain passes.] *Mete logiia i Gidrologiia*, No. 10:53–54, Oct. **1956. DWB, DLC**—In order to assist the migrat cattle industry during the migration from spring to summer pastures through mountain pas the hydrometeorological service of the Kazakh SSR organized a horse-mounted radiometeo logical service. Its equipment consisted of an aspirating psychrometer, hand anemome a radio and camping supplies. The weather station provided forecasts, storm warnings, to the migratory herdsmen during their migration. The details of the particular operat are presented. *Subject Headings:* **1. Meteorological services 2. Cattle raising 3. Weat forecasting 4. Kazakh, S.S.R.**—*I.L.D.*

9.11–92 551.524.372:633.4

Wilkins, Leland D. (*Pomona, Calif. W. B.*), **Preliminary report on critical temperatu for potatoes.** U. S. Weather Bureau, [**1957?**]. 4 p. photostat of typescript. **DV** (M24.37 U587pr)—Notes on critical temperatures for damage of a certain percentage potatoes at varying stages of development or in storage. Conditions in Kern County, Ca where potatoes are the 2nd largest crop ($33 million in 1955) are described, especially in relat to the frosts on the nights of March 6–7, and Feb. 2–3, and 16–17, 1956(?). Effect of tem on potato diseases is also discussed. *Subject Headings:* **1. Frost effects on potatoes 2. Ke County, Calif.**—*M.R.*

9.11–93 551.584.43:551.525:633

Zuev, M. V., **O formirovanii mikroklimata khlopkovogo polia.** [Formation of the mic climate of a cotton field.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematik Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 71–78. 2 fig 4 tables, ref., eqs.) **DLC**—In the analysis of the microclimate of a cotton field, three princip periods characterizing the condition of the layer near the ground are distinguishable. Up the middle of July, the soil surface exerts a predominant influence upon the meteorologic variables, from the middle of July to mid-Sept. the vegetation exerts the predominant effe (diurnal temperature inversion, high humidity, etc.) and during the third period, mid-Sep to the first frost, the influence of the soil gradually takes over again. With the aid of numeri data, the author discusses the relationship between the constituents of heat balance during t growth period of cotton, the heat flow from soil to air, heat loss by evaporation and transpir tion, daily totals of heat flow in the soil, the vertical distribution of temperature, absolute a relative humidity and the soil temperature. The fundamental factor influencing the micr climate of a cotton field is the green mass of the plants. *Subject Headings:* **1. Cotton fie microclimatology 2. Soil-air heat exchange 3. Soil temperatures 4. Cotton fields.**—*I.L.D*

9.11–94 551.586:663.97.

Pack, A. Boyd (*State Climatologist, U. S. W. B., Hartford, Conn.*), **Weather and the curi of cigar tobacco.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 43(38):7– Sept. 17, **1956. DWB, DLC, DA**—The Connecticut River Valley of northern Connecti and central Massachusetts is the center for cigar tobacco production. Air and wind veloci averaging from 5 to 10 m.p.h. are essential for the proper curing of cigar tobacco. Temperatu levels and the amount of humidity needed are also discussed. *Subject Headings:* **1. Tobac curing 2. Wind velocities 3. Connecticut 4. Massachusetts.**—*N.N.*

9.11–95 551.586:633.51

Baldwin, J. L. (*Off. of Climatology, U. S. W. B.*), **Climate and cotton culture.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 44(8):7–8, Feb. 25, **1957.** table. **DWB, LC, DA**—General discussion of weather and climate effects on cotton growth. Cotton is sensitive to the day-to-day changes in weather and grows best in the tropical and subtropical regions of the world. Its perennial growth is limited poleward by the isotherm of about 65°F. *Subject Headings:* **1. Cotton 2. Agricultural climatology 3. Weather sensitivity.**—*N.N.*

FOREST METEOROLOGY AND FIRE WEATHER

See also: **Tree and snow line** (Hermes), **9.11–21**; **Evap. from forest floors, Donner Summit** (Lowry), **9.11–111.**

9.11–96 551.5:632.187:06

U. S. Weather Bureau. Fire Weather Service, **[Annual Operational Report], 1955.** 55. 11 p. Mimeo. **DWB**(M09.584 U587fa, 1955)—Lists of broadcast times and stations and types of material broadcast for fire weather interests in Oregon (from Portland and Pendleton), forecasts and terminology, areas, stations reporting and collection centers, co-operative stations manned by Forest Service, etc., daily telephone reports, 10-day records, hygrothermographs and their care and other operational information are provided in outline form. *Subject Headings:* **1. Fire weather services 2. Oregon.**—*M.R.*

9.11–97 551.5:632.187

†U. S. Forest Service. Pacific Northwest Forest and Range Experiment Station, **Annual Report, 1957.** March **1958.** 82 p. figs., photos, tables. Annotated list of 65 publications of staff and others. **DWB** (634.9072 U584pr)—On p. 23–25 of this elaborate report of all types of forest and range research conducted in Washington and Oregon, there is a brief summary of work done in fire research, including: fire occurrence, fire season weather indexes, atmospheric stability and forest fire behavior and fire-season weather. The experiment station participated in preparation of a chapter on stability in the **National Fire-Weather Handbook** prepared by the Forest Service, the National Park Service and the U.S.W.B. Sept. 1957 was the worst month of an otherwise normal fire-year. The Watershed management research section (p. 57–60) reports details of forest cover-stream flow studies in Pacific Northwest forests. Douglas fir and Lodgepole pine forests in Oregon were found to intercept 24% of the summer and fall, and the winter and early spring precip., respectively. References to pertinent literature are found on p. 77 and 81. *Subject Headings:* **1. Fire weather research 2. Precipitation interception by forests 3. Washington 4. Oregon.**—*M.R.*

INDUSTRIAL METEOROLOGY

See also: **Ship stress due to waves** (Jasper), **9.11–75**; **Climate and air conditioning** (Thom), **9.11–287.**

9.11–98 551.57:625.712

Fischer, P. Leander, **Versuch einer Klassifikation der Strassenzustände.** [Attempt at a classification of street conditions.] *Wetter und Leben*, Vienna, 8(3/4):47–56, **1956. DLC**—The present ten international symbols do not satisfactorily characterize the complex condition of the streets of large cities. A more adequate classification system is proposed by the author. This article contains a summary of the international classification of the state of the ground, and the definitions and symbols of the more refined and precise classification of street conditions. The latter includes the symbols expressing the various conditions, namely, the dryness group, the muddy group, the snow group, smooth snow group, the ice group, shower group (ground covered with rime, hail, etc.), the snow mire group, etc. *Subject Heading:* **City street condition classification.**—*I.L.D.*

9.11–99 551.5:628.84

Kayan, Carl F. (*Dept. of Mech. Eng., Columbia Univ., N. Y.*), **Analysis of some cooled-structure problems by electrical analogy.** *New York Academy of Sciences Transactions, Ser. 2,*

19(3):252–270, Jan. **1957.** 16 figs., 9 refs., 17 eqs. **DLC**—An engineering study of heat and vapor diffusion through a space cooling concrete slab, using electrical analogy meth Minimum surface temperatures (and corresponding maximum permissible relative humi without condensation) are critical. Cooling slabs, with embedded pipes, may be eithe floor or ceiling. Various useful nomograms for air temp. and humidity (or dew point), or wet bulb temp. vs. vapor pressure, vapor pressure and temp., and resistance vs. temp. or va pressure or heat flow are presented, explained and used in examples. Actual tests were m and are reported. *Subject Headings:* **1. Heat-moisture relationships in cooled slabs 2. Coo by radiation 3. Air conditioning meteorology.**—*M.R.*

9.11–100 551.5:620.92:53

Smith, Maynard E. (*Brookhaven Natl. Lab., Upton, Long Island*), **Meteorology in relat to nuclear installations.** *National Conference on Applied Meteorology, Hartford, Conn., 1957, Proceedings*, issued **1957.** Section C:17–23. 15 refs. **DWB** (M A512pro)—Mete ology is no longer confined to the very limited advisory role characteristic of the early ato energy problems. Quite apart from the intensive work related to weapons testing, mete ologists have developed a wide variety of techniques and instruments for use in the more lo atomic energy problems, and their research has enlarged the scope and improved the accura of the necessary estimates of diffusion and deposition in nuclear safety problems. In t paper, the various activities undertaken by meteorologists at atomic energy sites are discuss *Subject Heading:* **1. Atomic energy meteorology.**—*Author's abstract.*

9.11–101 551.5

Tochko, John and Barlow, Milton F., **The Connecticut State highway meteorolog network.** *Weatherwise*, Boston, 10(2):39–41, April **1957.** 3 figs. **DWB**—A brief illustra article describing the origin of the supplementary reporting system for highways in Co begun as a result of calamities in April and Aug. 1955 when snowstorms and floods tied hundreds of motorists. Seven stations, evenly spaced around the state, have been instal at State Highway Patrol Barracks, where immediate reports can be obtained at any time the day or night, and where regular reports are made to Travelers Weather Service at Hartfo Conn. *Subject Headings:* **1. Highway meteorological services 2. Travelers Weather Resea Center 3. Connecticut.**—*M.R.*

9.11–102 551.5

†Waters, J. W., **Weather limitations to the construction of industrial establishmen** *Meteorological Monographs* (American Meteorological Society), Boston, 2(9):37–52, May 19 6 tables, 47 refs. **DWB, DLC**—The effect of weather conditions upon the construction indust is discussed from the viewpoint of both operational efficiency and cost of production. T following major divisions of the construction process are considered in: surveying, materi stockpiling, excavation, pile driving, concrete form construction, concrete pouring, mason structure, steel work, carpentry, roofing, plumbing and heating, electrical installation, paintin road and rail siding construction, etc. Low temperature, especially in combination wi permafrost, is an extremely important building factor. Also, the effects of high temperatu rainfall, snowfall, sleet and ice, high atmospheric humidity, wind, sunlight, etc. are consider in order of importance. Data are given on the estimation of low temperature limits to econom construction operations, limitations imposed upon excavation equipment by weather, e *Subject Headings:* **1. Weather effects on building construction 2. Industrial meteorolo 3. Low temperature effects.**—*I.L.D.*

9.11–103 551.5:621.3

†Waters, J. W., **Weather limitations to electric power utility operations.** *Meteorologi Monographs* (American Meteorological Society), Boston, 2(9):53–65, May **1957.** 2 tabl 20 refs. **DWB, DLC**—An attempt is made to determine the limitations imposed by extre weather conditions upon the efficiency of operation of electric power utilities, including bo the steam, hydro- and diesel-electric power generation and power distribution. Spec attention is given to the effect of low temperature (including critical temperatures), te perature operations upon power production in steam plants (upon cool storage, handling a

eparation upon water intake and circulation and boilers), upon production of hydro-plants luding water storage and intake, upon production of diesel plants including the power plant ctrical system, substation equipment, transmission and distribution. Also, the effect of ound frost resulting from prolonged subfreezing atmospheric temperatures upon building ndations, pole installation, wind instability, piping and water supply are considered. In dition, the untoward effects of high temperature, rainfall, sleet ice and frost, humidity, htning and sunlight are discussed. A table giving the relative effect of weather elements on ctric power utility subdivision is presented. *Subject Headings:* **1. Weather effects on ctric power 2. Low temperature effects.**—*I.L.D.*

9.11–104 551.5:669.18

Waters, J. W., **Weather limitations to primary iron and steel plant operations.** *Meteorogical Monographs* (American Meteorological Society), Boston, 2(9):87–95, May **1957.** 4 bles, 7 refs. **DWB, DLC**—A discussion of the limiting role of weather extremes in the ficiency of operations of primary iron and steel plants and the successful adjustments in plant erations to minimize the untoward effects of weather extremes. The major divisions nsidered are: coke ovens, coke oven by-product plant, blast furnaces, open hearths, rolling ills, utilities, inter-plant transportation, storage of iron and steel products and administration. he influence of low temperature upon plant operations and personnel efficiency, the role of infall as it affects coal storage, the water supply, the disruptive effect of snow fall on interlant traffic, and the effect of high temperature, of humidity, sleet and ice and wind are condered. Low temperature and permafrost are the only conditions imposing serious limitations pon the operation of steel plants. Data on effect of low temperatures upon steel plant perations (optimum, critical minimum) and on water requirements of plants for various perations are presented. *Subject Headings:* **1. Weather effects on steel industry 2. Low mperature effects.**—*I.L.D.*

MEDICAL METEOROLOGY

9.11–105 551.586:612

†Van Bosveld Heinsius, Jacques, **Over de reactie van het menselijk lichaam op afkoeling an de omgevende atmosfeer, gemeten aan het metabolisme.** [About the reaction of man n cooling of the surrounding atmosphere measured by the metabolism.] Thesis (Doctor's)—trecht Univ. **1953.** 76 p. 5 figs., 10 tables, chart, 89 refs. English, French and German ummaries p. 66–71. Title in Dutch and English. **DLC** (QP82.B6)—An experimental ıvestigation on three male adults to determine the effect of cooling of the ambient atmosphere pon the metabolism rate. The influence of extreme radiation in body temperature by intense ooling frequently employed in surgical operations is not considered. The response of metbolic rate to sudden lowering of the air temperature to 5°C and to gradual lowering over a eriod of 40 minutes to 5°C was investigated. Metabolic rate was measured by the diaharometric method in each case during twenty minutes. Thirty-nine tests were made of ach, at intervals of a week and at the same hour of the day. All subjects manifested an ıcreased metabolism which was greater on gradual than sudden cooling. The author presents review of the literature on the physiological effects of cooling. A description of the conıruction and operation of the apparatus for measuring metabolic rate (metabolism chamber ıanufactured by Noyons), the experimental procedure, the calculations and tables containing ıe calculated metabolic rates are included. *Subject Headings:* **1. Temperature effects on ıetabolism, 2. Cooling power.**—*I.L.D.*

9.11–106 551.586

*Thams, J. C., **Hitze und Schwüle einer italienischen Grossstadt.** [Heat and sultriness f a large Italian city.] *Naturforschende Gesellschaft in Zürich, Viertel-Jahrsschrift*, p. 240–252, **951.** 3 figs., 12 tables, 19 refs.—This bioclimatic study of the climate of Milan contains an ıalysis (supplemented by data) of the heat and sultriness, based upon a 30 yr record of thrice aily observations which includes vapor pressure data, made at the Osservatorio Astronomico Brera. Data are given on absolute maximum daily temperatures, number of summer and opical days and tropical nights, duration of summer and tropical days, relative humidity ıd limiting temperature, mean monthly number of sultry days, mean monthly number of

fixed observations at which sultriness prevailed, mean monthly number of days on whic these fixed observations manifested sultriness, duration of successive sultry days, hu tropical thunderstorms and hail etc. A sultry day is defined as one during which at leas of the three fixed observation hours a vapor pressure of 14.1 mm Hg was recorded. *Su* *Headings:* **1. Sultriness data 2. Vapor pressure data 3. Maximum temperatures 4. Cli of Milan 5. Milan, Italy.**—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Co-operative radio observers, Kazakhstan** (Porfir'ev), 9.11–90; **Met. services, Kazakhstan** (Vishnenko), 9.11–91; **Frontal analysis with vertical cross section** (Burkova), 9.11–134; **Radioactive tracers** (Miyake), 9.11–173; **Jet stream nomograms** (Morley), 9.11–188; **Graphical presentation of temp. probabilities** (Lackey), 9.11–207; **Visibility code numbers** (Williams), 9.11–293; **IGY atmos. elec. stations** (Mühleisen), 9.11–298

9.11–107 551.501:551.510.7:5

Facy, L. (*Météorologie Nationale, Paris*), **Quelques idées exprimées du point de strictement météorologique.** [Some ideas expressed from a strictly meteorological poin view.] *International Geophysical Year*, 1957/1958, *Annals*, 5(IGY Instruction Manu Pt. 5:340–343, 1958. DWB—A review is given of the purely meteorological problems nected with the use of radioactive tracers in the atmosphere. The importance of the meas ment of natural radioactivity for the study of the lower layers of the atmosphere is pointed On the other hand it is questioned if more information can be obtained than from nor stability considerations. Furthermore, attention is drawn to the extremely complex na of the mixing processes, owing to the occurrence of jet streams, typhoons and tornadoes wh jeopardize the function of the tropopause as a barrier for vertical mixing postulated by o speakers. Finally, the processes in the free atmosphere which play their part in the wash- and deposition of radioactivity, and the consequent problems with which the meteorolo will be faced when studying the data obtained with the several measuring devices in use, discussed in some detail. *Subject Headings:* **1. Radioactive tracers 2. Radioactive rain 3. Radioactivity meteorology 4. IGY instruction manuals.**—*Author's abstract.*

9.11–108 551.501:551.510.7:539.6:551.51

Machta, Lester, **Some applications of radioactive tracers to large-scale meteorolog problems.** *International Geophysical Year*, 1957/1958, *Annals*, 5(IGY Instruction Manu Pt. 5:313–323, 1958. 17 figs., 2 tables. DWB—Examples of the use of naturally occurr radio isotopes include vertical distribution of radon as a measure of diffusion and rela air transport and air trajectories near water bodies. Man-made radio isotopes have b traced on a global scale. They have revealed evidence of stratospheric-tropospheric excha rates, removal times of particulates from the troposphere (including the role of precipitat in this removal), lateral mixing on both a continental and global scale, exchange of wa vapor between the hemispheres, and have been used to verify meteorological trajector *Subject Headings:* **1. Radioactive tracers 2. Radon content of atmosphere 3. Vertical change 4. Radioactive isotopes 5. IGY instruction manuals.**—*Author's abstract.*

9.11–109 551.501:551.510.7:539.6:546.

Machta, Lester (*U. S. W. B., Wash., D. C.*), **Use of radioactive tracers in meteorolo** *International Geophysical Year*, 1957/1958, *Annals*, 5(IGY Instruction Manual), Pt. 5:309–3 1958. 3 figs. DWB—Meteorologists are interested in both natural and man-made rad activity. With regard to the natural radioactivity, the IGY may be the ideal time to m as many of its characteristics as possible. It is further pointed out that land surfaces produ most of the radon, and that the radon concentration over large water bodies is considera lower than over land areas. This makes it possible to distinguish continental and mariti air masses. Measurement of radon content of air in the vertical may also provide us with

st estimates of large-scale tropospheric mixing rates. The study of radio-nuclides created cosmic radiation is also of importance. Man-made radioactivity is provided for the ophysicist by nuclear tests. It will be possible to study atmospheric motion and mixing ocesses. The meteorologist is particularly interested in the residence time of particulate bris in troposphere and stratosphere. Other potentialities exist for investigating certain oblems. C^{14} could be used in studies of the contamination of the atmosphere by CO_2 (e.g., search on increase of CO_2 content since 1900, and Los Angeles smog problems). *Subject adings:* **1. Radioactive tracers 2. Radon content of atmosphere 3. Tropospheric mixing IGY instruction manuals.**—*Author's abstract.*

9.11–110 551.501:551.578.46

Ônuma, Masayuki (*Branch ST. Snowy Dist. of Agriculture, Yamagata*), **Snow surveying various snow samplers.** *Researches on Snow and Ice*, Tokyo, No. 2:185–194, Jan. **1955.** figs., tables, 7 eqs. In Japanese. **DWB**—Determination of N, number of sampling, hich justifies within maximum error e with the level of significance α, is studied from the lation between the average value and statistical true value obtained by a certain number of mplings: when α is 0.05 and e is less than 10% $N=3$, when e is less than 5% $N=4$. Examin- g the relation between the diameter of snow sampler and snow cover depth, x, which is nount of sampled snow by different diameter of sampler, is obtained from the following eqs.:

$$x=Pm$$

$$P=1-K\frac{8h}{\phi^2}\cdots P=1-K\frac{8h}{\phi^2},$$

here P is the rate of sampling, m of population mean of sampling, snowcover depth h, effective iameter of sampler ϕ, and K is the coefficient of material of sampler, shape of knife edge, ainting material, and kinds of snow; experimental value of K is 0.027. *Subject Heading:* **Snow sampling.**—*J. Woo.*

9.11–111 551.501.4:551.573:551.588.6

Lowry, William P. (*Dept. of Met., Univ. of Wisconsin, Madison*), **Evaporation from forest oils near Donner Summit, California and a proposed field method for estimating evaporation.** *cology*, Durham, N. C., 37(3):419–430, July **1956.** 16 figs. (incl. photos), 2 tables, 11 refs., 0 eqs. **DWB, DLC**—Two standard field methods for approximating evaporation (rates) ased on the vapor pressure deficit concept have been reviewed and applied to data collected n several kinds of environments near Donner Summit, Calif. The reliability of the methods t high altitudes compares with results reported in other areas. A mathematical extension f the vapor pressure deficit equation is developed, leading to a much simplified method of aking field approximations. If a soil-filled pan is placed level with the soil surface and eighed periodically to obtain a measure of evaporation, and a hygrograph giving a continuous umidity record is placed beside the pan, it is shown that the area under the humidity trace on he chart and between the beginning and ending times of the observation period yields a traight line relationship when plotted on log-log graph paper against the evaporation meas- red for the same period. *Subject Headings:* **1. Evaporation calculations 2. Evaporation from orest floors 3. Donner Summit, Calif.**—*Author's summary, I.L.D.*

9.11–112 551.501.8:551.506:77.9

Thompson, G. K. (*Blue Hill Met. Obs.*), **System for recording eight meteorological ele- ents simultaneously on moving film (Weatherlog).** Blue Hill, Mass. Meteorological Ob- ervatory, Contract AF 19(604)-950, Meteorological Radar Studies, No. 8, March 10, **1958.** 9 p. 11 figs., 3 refs. **DWB**—Weatherlog is a system which continuously and simultaneously ecords eight meteorological elements on 35 mm film. The recorded elements are temperature, ew point, wind speed, wind direction, barometric pressure, precipitation rate, precipitation ggregate and electric field intensity. The primary purpose of the system is to provide on a ngle photographic print a consolidated record of ground weather conditions. The data on he print are studied coincidentally with a record of overhead cloud and precipitation structure s observed by 1.25 cm vertical beam Radar AN/APS-1, (modified). The two sets of data re recorded separately, but on the same time base. Weatherlog is operated as an adjunct

to the weather radar installation located adjacent to the Blue Hill Meteorological Observat Milton, Mass. The report illustrates and describes the principal components of the Weathe system and shows basic circuitry, including techniques peculiar to the system. *Su Headings:* **1. Weatherlog system 2. Meteorological data films 3. Radar photograph** *Author's abstract.*

OBSERVATIONAL DATA

See also: **Air temp., Bratislava** (Konček), 9.11–22; **Upper air winds, S. Atlantic** (Kuhlbrodt), 9.11–23; **Climate, Frankfurt a.M.** (Mollwo), 9.11–24; **Aurora Australis catalogs, New Zealand** (Thomsen et al.), 9.11–27; **Actinometric data & networks, Japan,** 9.11–31; **Soviet Antarctic exped.** (Barashev), 9.11–35; **Soviet program for IGY, CSAGI meeting, Brussels 1956** (Pinus), 9.11–39; **Danish Pearyland exped., 1947–50** (Troelsen), 9.11–44; **Antarctic exped. data inventories** (Venter), 9.11–54; **Chatham Is. Exped. (1954)** (Knox), 9.11–72; **Oceanog. cruise obs.,** 9.11–74; **Stratospheric temp., N. Hemisphere** (Tolefson), 9.11–87; **Met. data films** (Thompson), 9.11–112; **Aerobee obs.** (Bartman et al.), 9.11–119; **Atmos. potential gradient measurements, Zue** (Vinogradov), 9.11–300.

9.11–113 551.506:551.521

*Jaroslavtsev, I. N., **Rezul'taty ucheta solnechnoĭ energii v Uzbekistane.** [Result calculations of solar energy in Uzbekistan.] (In: Akademiia Nauk Uzbekskoĭ SSR. Inst Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p 10. 7 figs., 8 tables, 13 refs., 8 eqs.) **DLC**—The types of radiation observations carried at the Tashkent Geophysical Observatory since 1926 are discussed and the following radia data are presented in tables: mean monthly and annual totals of direct solar radiation an their extremes upon a horizontal and perpendicular surface for the period 1926–1952; m monthly and annual totals of solar and sky radiation, of sky radiation, and their extre from 1936–1953; mean monthly and annual total radiation reflected by natural ground co for the period 1945–1952; mean monthly and annual total of radiation balance for the per Aug. 1950–Sept. 1953 and of their extremes; and mean monthly annual total radiation bala for a natural ground cover and of the outgoing radiation for the ground surface and of t extremes for the period Aug. 1950–Sept. 1953. The radiation is measured in cal/cm², eit per month or year. A graph showing the annual variation of radiation balance, and of outgoing radiation of ground-sky, is presented. The data are analyzed and their meanin discussed. *Subject Headings:* **1. Radiation data 2. Radiation balance 3. Solar radiat 4. Sky radiation 5. Uzbekistan, U.S.S.R.**—*I.L.D.*

9.11–114 551.506:551.55

Johnson, Oliver, **Analysis of gustiness over prairie grass and over a snow surface.** *Cana Suffield Experimental Station, Ralston, Alberta, Suffield Technical Paper,* No. 104, Feb. **1957.** 6 p. 10 figs., 6 refs. **DWB** (M055 C212s)—A considerable number of measureme of gustiness of the wind at 2 m above a prairie grass surface and above a snow surface h been analyzed in order to determine its variation with wind speed, temperature gradient a the stability factor. A comparison has been made of gustiness, temperature gradient, stabil factor and wind speed over long and short prairie grass and over a snow surface. In gene the gustiness was found to be independent of wind speed down to 7 mi/hr. Below this va the gustiness decreased with decreasing wind speed. The gustiness varied little with te perature gradient under lapse conditions but decreased with increasing inversions. O prairie grass the gustiness was independent of the stability factor under lapse conditions, decreased with increasing inversions. The gustiness, temperature gradient, stability fac and wind speed were found to depend on the nature of the surface. *Subject Headings:* **1. Gus ness measurements 2. Gustiness profiles 3. Surface cover effects on gustiness.**—*Autho abstract.*

9.11–115 551.506.1:551.582.2(4

§*Sneyers, R., **Le temps en 1954.** [Weather in 1954.] *Belgium. Institut Royal Météo logique, Publications, Ser. B,* No. 19, **1955.** 46 p. 15 figs., 7 tables. **DWB.** Shorter vers (without Pt. 3, **Extraits des observations du réseau climatologique,** of 12 p.) in *Ciel et Te*

Brussels, 71(11/12):397–413, Nov./Dec. **1955.** Also: Sneyers, R., **Le temps en 1955.** [Weather in 1955.] *Belgium. Institut Royal Météorologique, Publications, Ser. B*, No. 21, **1956.** 46 p. 5 figs., tables. **DLC** (30108)—The first paper gives a thorough analysis, with accompanying graphs, tables and charts, of the weather at Uccle, at 5 other stations and in 14 regions of Belgium, during the period Dec. 1953–Nov. 1954, inclusive. In Pt. I (p. 3–19) the general weather and the specific elements are discussed for the year as a whole. In Pt. II (p. 21–34) the weather of each individual month is discussed, and in Pt. III (p. 35–46) a table is given for each month, presenting mean temperature days with precipitation and frost, and regional mean precipitation by decades. The second paper gives the usual complete analysis and description of the weather each month of the year 1955, plus tables of average and daily values, records of unusual occurrences, charts for Belgium showing seasonal anomalies of temperature, wind frequency histograms, and a synoptic chart of the cyclone of Dec. 23, 1954. Most of the data are for Uccle, near Brussels. *Subject Headings:* **1. Annual meteorological reports 2. Uccle, Belgium 3. Belgium.**—*M.R.*

9.11–116 551.506.2(54)

*Kulkarni, S. B. (*Met. Off., Poona*), **Weather on the Republic Day.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(1):119–121, Jan. **1957.** 3 tables. **DWB, DLC**—Data for Jan. 26 on rainfall of 0, .01–.04, .05 or more and .01″ or more, and on cloud amounts at 20 stations in India are analyzed to show the percentage of days with clear, cloudy, fair or rainy weather on Republic Day (when celebrations occur all over India). In the 50 yr period (1907–56) no rain fell at Bombay or Poona between 8 a.m. the 26th and 8 a.m. the 27th of Jan.; most stations had 1–4 days and Srinagar had 21 days (westerly disturbances). *Subject Headings:* **1. Republic Day weather, Jan. 26 2. Holiday weather statistics 3. India.**—*M.R.*

9.11–117 551.506.1:551.582.2(493)

Sneyers, R., **Le temps en janvier et février 1958.** [The weather in Jan. and Feb. 1958.] *Ciel et Terre*, Brussels, 74(3/4):241–245, March/April **1958.** 2 tables. **DLC**—Description of the weather in Belgium during the first two months of the year is given. Normal temperature, poor insolation, rather frequent and normally abundant precipitation in Jan., but very frequent and very abundant precipitation in Feb. are noted. *Subject Headings:* **1. Climatic data 2. Belgium.**—*A.V.*

9.11–118 551.506.8(493)

*Lardinois, E., **Observations phénologiques à Uccle au cours de l'année 1954.** [Phenological observations at Uccle during 1954.] *Ciel et Terre*, 71(9/10):347, Sept./Oct. **1955.** Also . . . **1957.** *Ibid.*, 74(3/4):237–240, March/April **1958.** tables. **DWB, DLC**—In the first paper a brief description of relevant weather information for 1953/54 is given and compared with phenological data for some 50 plants and trees at Uccle. Normal data are given also for the period 1896–1940. The second report covers phenological observations made in 1957 at Uccle and at certain stations located in central, eastern and southeastern Belgium. The author gives a short summary of the weather at Uccle during the first three seasons of the year. He indicates the dates of the starting of blossoming period for about 50 plants and also the deviation with regard to the normal date of flowering. (For 1955 report *see* 9.7–114, July 1958, *MAB*.) *Subject Headings:* **1. Phenological observations 2. Uccle, Belgium.**—*A.V.*, *A.A.*

INSTRUMENT CARRIERS

See also: **Rocket exploration of upper atmos.** (Link, Neužil), 9.11–9; **Rockets & space ships** (Ley), 9.11–37; **IGY rocket program** (Spencer), 9.11–40; **Satellite observatories** (Le Claire), 9.11–83; **Satellite obs. & air density calculations** (Sterne, Schilling), 9.11–84; **Atmos. densities inferred from satellite obs.** (Sterne et al.), 9.11–159; **Rocket-borne photometers for measuring night air-glow** (Heppner, Meredith), 9.11–203; **Infrared studies with balloon-borne spectrometers** (Murcray et al.), 9.11–206.

9.11–119 551.507.362:551.506.7

*Bartman, F. L.; Liu, V. C. and Wenzel, E. A., **Atmospheric phenomena at high altitudes.** Michigan. Univ. Engineering Research Institute, Contract DA-36-039 SC-64659, Project

DA-3-17-02-001, Quarterly Report Aug. 1–Oct. 31, 1957. Issued Dec. 1957. 18 p. 4 fig 9 tables. Also: Quarterly Report, Nov. 1, 1957–Jan. 31, 1958. Issued April 1958. 21 2 figs., 7 tables. DWB (M10.5 M624ad)—Three grenade Aerobees were fired at Ft. Churcl in August, all successfully. Construction of the instrumentation for the final four grena Aerobees to be fired in December and January was completed. The last Aerobee, SM2:: will also carry a small falling sphere to measure density. Data reduction of SM1:01 w checked and errors corrected. Data reduction of SM1:02 was started. Two analyses of g accumulated in upper-air sampling bottle C-23-B were made. A new system for measuri helium leakage in sampling bottles was devised and used successfully. Two papers on ae dynamic research by V. C. Liu were submitted for publication: **Theory of flight of the soundi rocket** (*J. App. Mech.*) and **On the drag of a sphere at extremely high speeds** (*J. App. Phys Subject Headings:* **1. Aerobee rocket instrumentation 2. Aerobee observations.**—*Autho abstract.*

INSTRUMENTS

See also: **Actinometry tests & observations** (Ianishevskii), 9.11–11; **International Pyrheliometric Scale, 1956** (Courvoisier), 9.11–18; **Antarctic met. instrument performance** (Nagel), 9.11–51; **Nuclei sampling methods** (Pollak, O'Connor), 9.11–237; **Photoelectric nuclei counters** (Pollak et al.), 9.11–238; **Electric cloud- drop counters** (Keily), 9.11–242.

9.11–120 551.508.

Zikrillaev, F., **Temperaturnyĭ koeffitsient aktinometricheskikh priborov i metody e opredeleniia.** [The thermal coefficient of actinometric instruments and its determinatio (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Meteorologiia gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 23–33. 7 figs., 8 tables, 13 refs., 8 eqs **DLC**—The external and internal factors influencing the sensitivity of an actinometer ar discussed, and Soviet research on the effect of temperature upon the sensitivity of an a tinometer and the temperature coefficients of the photoelements are reviewed. This is fo lowed by an account of laboratory experiments in which the temperature coefficients of number of actinometers were determined by using a thermostat which automatically maintai a constant temperature with a precision of ±0.01 and even ±0.005°C. With the aid of diagram the author describes the mechanism of the thermostat and presents the results experiments on the temperature coefficients of the Ianishevskiĭ pyranometer, the Mikhel'sc bimetallic actinometer, the Ianishevskiĭ thermoelectric actinometer, the Savinov pyrgeomet and the temperature coefficients of the selenium and sulfur-silver photoelectric element The data are presented in both tables and graphs. *Subject Headings:* **1. Actinometer sensitivi 2. Thermal coefficients of actinometers.**—*I.L.D.*

9.11–121 551.508.2

Cole, Kenneth S. (*Lab. of Biophysics, Res. Div., Natl. Inst. of Health*), **Thermistor ther mometer bridge: linearity and sensitivity for a range of temperature.** *Review of Scientif Instruments*, New York, 28(5):326–328, May **1957.** 4 figs., 2 foot-refs., 6 eqs. **DWB DLC**—The balance point of a Wheatstone bridge with a slide wire for ratio arms is a nearl linear function of the temperature of a thermistor in a third arm, the maximum errors of linear calibration are made equal and proportional to the cube of the temperature range, an the off-balance sensitivity is nearly constant for a considerable temperature range. For small thermistor with a 2000-ohm resistance at 25°C, the slide position of a linear potentiomete is proportional to the thermistor temperature ±0.5°C, and the deflection of a taut suspensio pointer galvanometer is 20±1 mm/°C over the temperature range from 0°C to 50°C with maximum thermistor temperature rise of 0.05°C in still air. *Subject Heading:* **1. Thermisto thermometers.**—*Author's abstract.*

9.11–122 551.508.4

Koch, F., **Über die Temperaturabhängigkeit eines empfindlichen Barographen.** [Th temperature dependence of a sensitive barograph.] *Frankfurt a.M. Universität. Meteoro logisch-Geophysikalisches Institut, Berichte*, No. 6:34–35, **1956.** 2 refs. **DWB?**—The autho

iscusses the performance and temperature dependence of a very sensitive barograph con-tructed at the Frankfurt Meteorological Institute by improving the bearing and lever mech-nisms of a Fuess aneroid. The apparatus has a weekly and monthly cycle. The temperature ompensation of the aneroid elements are such that a 10°C change in temperature leads to a ointer stroke of 0.017 cm. In cases of large temperature amplitudes it is possible to insert ompensatory structures so as to eliminate the stroke of the aneroid and the lever mechanisms. neroids made of Invar, for example, must be used. The calibration to compensate tem-erature effect is described. A pressure registration error of 1.14×10^{-4} cm, resulting from a emperature change of 1°C, was attained. *Subject Headings:* **1. Barograph temperature ensitivity 2. Aneroid barometers.**—*I.L.D.*

9.11–123 551.508.71

Väisälä, Vilho and Huovila, Seppo, **A mixing hygrostat.** *Helsinki. Universitet. Me-eorologiska Institutet, Mitteilungen, Ser. A*, 6(3), **1957.** 12 p. 6 figs., 6 tables, 3 refs., 10 eqs. **)WB, DLC**—A chamber for calibrating humidity elements of radiosondes at 3 points on the cale is described and illustrated. The principle is based on the fact that a small air movement s sufficient for maintaining a constant humidity. Several elements can be calibrated at nce. It will not work below the freezing point without slight modification of the water rrangement to allow for use of pieces of ice. Results of several runs—Jan. and Feb. 1956—re given and analyzed. *Subject Headings:* **1. Humidity calibration chambers 2. Mixing ygrostats.**—*M.R.*

9.11–124 551.508.765:551.576.11

Miura, Akira (*Geophysical Inst., Faculty of Sci., Tôhoku Univ.*), **The measurement of the liquid water content in supercooled cloud and the rate of growth of icing.** *Tôhoku Univ., Science Reports, 5th Series, Geophysics*, 9(1):29–35, July **1957.** 5 figs., 4 tables, 7 refs., 3 eqs. **DWB, DLC**—A liquid water content meter of the type of the electrolytic hygrometer was constructed, and observations made on the liquid water content in a supercooled cloud on the summit of Mt. Zao and on a slope of Mt. Onikatsura. On the basis of the observations, the mass accumulation of ice on the wires were calculated and examinations made of the collection efficiency for the rime. *Subject Headings:* **1. Liquid water content meters 2. Liquid water content of clouds 3. Ice accumulation 4. Mt. Zao, Japan 5. Mt. Onikatsura, Japan.**—*Author's abstract.*

9.11–125 551.508.765:551.576.11

Owens, George V., **Wind tunnel calibrations of three instruments designed for measurement of the liquid-water content of clouds.** Chicago. Univ. Dept. of Meteorology. Cloud Physics Lab., Research Grant G-2164 (from Nat. Sci. Found.), Technical Note, No. 10, Dec. 31, **1957.** 15 p. 11 figs., 11 refs. **DWB** (M74.1 C532ten)—The calibration of three liquid water sensing devices—a paper tape conductometric instrument, a hot wire instrument and a chemical reagent conductometric instrument, performed in the Cloud Physics Laboratory wind tunnel, is described. A method for the determination of actual liquid water content in the tunnel, using one of the instruments being tested, is demonstrated. It is shown that the application of this wind tunnel calibration, to a comparison of values determined from cloud droplet samples with those obtained from the paper tape instrument, results in an improved correlation. *Subject Headings:* **1. Liquid water content of clouds 2. Liquid water content meters 3. Wind tunnel experiments.**—*Author's abstract.*

9.11–126 551.508.79

Twomey, S. (*C.S.I.R.O., Sydney, Australia*), **The collection of cloud water by a vertical wire mesh.** *Puy de Dôme. Observatoire, Bulletin*, Ser. 2, No. 3:65–70, July/Sept. **1956.** 4 tables, 2 refs. **DWB**—An experiment, conducted in Feb. (13–21) 1956 on Mt. Wellington, Tasmania, showed that a rain gage placed under a vertical wire screen (mesh) caught an average of >10 times as much water as did a gage placed by itself in an open space nearby. In several cases, over 100 times as much and in one case 224 times as much water was caught. Wind speeds were from 3 to 10 m/sec, and cloud drops mainly in the 20–30μ range. It is shown that the amount caught is of the right order of magnitude when compared with the collection efficiency of the screen and the water content of the clouds. Also, it is shown that the extra

water could not be accounted for by a capturing of raindrops (as distinguished from cl drops) by the mesh. *Subject Headings:* **1. Cloud drop collection by wire mesh 2. Mt. W ington, Tasmania.**—*M.R.*

9.11–127 551.508.822(

Veidner, I. N., **K istorii vozniknoveniia i razvitiia metoda radiozondirovaniia.** [Hist of the origin and development of the radiosonde method.] (In: Akademiia Nauk Uzbeks SSR. Institut Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Ta kent, **1955.** p. 225–229, 3 refs.) **DLC**—In a brief sketch of the history of the investigat of the upper atmosphere in Russia, the author mentions that in 1804 IA. D. ZAKHAROV ma the first scientific flight in a free balloon; in 1806 I. F. KRUZENSHTERN used balloons w heated gas to observe wind conditions. This brief note is followed by a more detailed acco of the development of aerological investigations in the Soviet Union, particularly by the w of P. A. MOLCHANOV and his collaboration. To MOLCHANOV, the author attributes the ori of the radiosonde which was first mentioned in his book **Vozdushnyii Okean (Atmosphe ocean)** which appeared in 1923. The introduction of radiosonde observations in various pa of the U.S.S.R., particularly in Central Asia, is summarized. *Subject Headings:* **1. Hist of radiosondes 2. History of upper air sounding 3. U.S.S.R.**—*I.L.D.*

9.11–128 551.594.6:551.508

Dinger, Harold E. (*Naval Res. Lab., Wash., D. C.*), **Sifflements atmosphériques exceptio nels.** [Exceptional whistling atmospherics.] *L'Onde Électrique*, Paris, 37(362):526–5 May **1957.** 11 figs. **DLC**—Some 90 photographs of spectrograms obtained from tape reco ings of whistlers made in Wash., D. C., in 1955 and 1956 are presented. Most of these whistl (generally connected with intense geomagnetic activity) display characteristics which are variance with available theory of propagation. This is particularly true of the types havi components whose frequency rises progressively. *Subject Headings:* **1. Whistling atmospher 2. Washington, D. C.**—*G.T.*

9.11–129 551.508.91:551.57

Warner, J. (*Radiophysics Lab., Sydney, Australia*), **An instrument for the measureme of freezing nucleus concentrations.** *Puy de Dôme. Observatoire, Bulletin*, Ser. 2, No. 2:35–4 April/June **1957.** 5 figs., 3 tables, 4 refs. French and English summaries p. 35. **DWB** Variations in atmospheric concentration of freezing nucleus can be determined by the i strument described. The air within a 10 liter tank at −12°C is compressed to a determin pressure and released instantly whereby a supercooled fog is produced. Its ice crysta resulting from present active freezing nuclei, fall into a supercooled sugar solution permitti growth, inspection and counting. *Subject Headings:* **1. Freezing nuclei counters 2. Freezi nuclei counting techniques.**—*W.N.*

9.11–130 551.508.95:551.594.12:551.521.

Miranda, Henry A., Jr. (*Physics Dept., Fordham Univ.*), **The ionization due to be radiation from the atmosphere.** *Journal of Geophysical Research*, Wash., D. C., 63(1):147–15 March **1958.** table, 11 refs., 4 eqs. **DLC**—Measurements of the ionization due to be radiation from the air, employing two thin-walled ionization chambers in a differential arrang ment, are described. Corrections for geometry, absorption of beta and gamma radiation in t shield, formation of secondary betas in the shield, and back-scattering of betas within t chamber are discussed. The results of 73 measurements, taken throughout the summers 1955 and 1956, are reported. Two-thirds of all the measurements fall within a range extendi over one order of magnitude. The weighted mean of all the measurements is 0.671. This roughly ten times the expected value, computed from radon and thoron concentratio measured at this locality. Wide (and rapid) fluctuations in ionization current were al noted. All the mechanisms coming to mind which might account for the excess ionizati observed over that expected are discussed, and rejected on various grounds. By process elimination, the possibility of the existence of a "very soft" cosmic-ray component is suggeste *Subject Headings:* **1. Beta ray ionization 2. Ionization chambers 3. Ionization measurement** —*Author's abstract.*

9.11–131 551.508.99:551.510.721

Blifford, Irving H., Jr. (*Hdqs., AF Cambridge Res. Center, Bedford, Mass.*), **Methods of sampling atmospheric radioactivity.** *International Geophysical Year*, 1957/1958, *Annals*, (IGY Instruction Manual), Pt. 5:352–354, **1958.** 7 figs., 4 refs. **DWB**—Devices used by the U. S. Naval Research Laboratory for measuring fallout and particulate matter in the atmospheric radiation program are described. The collecting methods mentioned include the rimmed film collector, a rain water collector, cloth screen collector, and screens using turbine blowers and vacuum pumps. *Subject Headings:* **1. Radioactive measuring devices 2. Radioactive fallout.**—*Author's abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Numerical forecasting studies, Tokyo,** 9.11–3; **Lee wave forecasting** (Alaka), 9.11–14; **Data transmission-incremental modulation technique,** 9.11–17; **High alt. flying forecast manuals,** 9.11–33; **Synoptic met., Antarctic** (Schmitt), 9.11–52; **Antarctic met. stations** (Taljaard), 9.11–53; **Total momentum-weather relationships** (Mitomo), 9.11–178; **Synoptic studies, Japan** (Suda), 9.11–193; **Typhoon forecasting** (Tanaka et al.), 9.11–200.

9.11–132 551.509.312

Syōno, S. and Aihara, M. (*Geophysical Inst., Tokyo Univ.*), **Some characteristic features of barotropic disturbances, Pt. 1.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 35(1):12–18, Feb. **1957.** 2 figs., 6 refs., 59 eqs. Also, Pt. 2, *Ibid.*, Ser. 2, 35(2):128–136, April **1957.** 14 figs., 7 refs., 95 eqs. **DWB, DLC**—Using the nondimensional barotropic vorticity equation, various aspects of barotropic disturbances are investigated. First we obtained the criterion for similarity of two kinds of barotropic motions and compared them with two wave systems, one having characteristic quantities of the disturbances in the actual atmosphere and the other having those in a model tank. Second, general nature of the pattern of the disturbance is discussed by expanding the nondimensional stream function in the power series of nondimensional time. The time change of the kinetic energy is also treated similarly. Third, general character of disturbances in a closed zonal belt is discussed. Fourth, to make the general discussion on the disturbances in a closed zonal belt more specific, a simple disturbance in a jet-like zonal basic flow similar to that treated by Kuo is considered. Expanding all quantities in power series of nondimensional time, the velocity and energy of the mean zonal flow are calculated up to the terms of the fourth derivative. The increase or decrease of the kinetic energy of the disturbance is investigated also up to the fourth derivative of time. The change in the profile of the mean zonal flow is also treated. In Pt. 2, kinetic energy exchange between a mean flow and a superposed disturbance in a two dimensional nondivergent fluid is investigated for a special example. It is found that, at initial moment, kinetic energy is transferred from the disturbance to the mean flow, if the mean flow has a scale which is smaller than the scale of the disturbance. Kinetic energy is transferred in the opposite direction if the opposite situation occurs. The mean flow kinetic energy reaches an extremum value after time Θ, which is a characteristic quantity, determined by the initial field of the fluid system. After that, the change of the mean flow energy occurs in opposite sense. Earth's rotation has a stabilizing effect, in the sense that it has a tendency to keep the state of the mean flow in the original one. *Subject Headings:* **1. Numerical forecasting 2. Barotropic theory.**—*Authors' abstract.*

9.11–133 551.509.313:551.577

*§Smebye, Sigurd J. (*Weather Forecasting Research Center*), **Computation of precipitation from large-scale vertical motion.** Chicago. Univ. Dept. of Meteorology, Contract AF 19(604)-2179, Scientific Report, No. 3, Nov. **1957.** 43 p. 17 figs., 2 tables, 16 refs., eqs. **DWB** (M(055) C532sr)—The vorticity equation, the equation of continuity, and the first law of thermodynamics are used to construct a prediction model which will account for the precipitation due to large-scale vertical motion. In the derivation of the model, the quasi-geostrophic approximation is used; the thermal structure of the atmosphere is represented by

the observed temperature at the 700 mb level and a standard stability factor; the effect external sources of heat is ignored while that of the released latent heat is included by approximation; orographic influences are included in the boundary condition; and the amou of precipitation are computed on the assumption that all condensed water falls to the ear The model is tested on seven different synoptic situations in the U. S., ranging from ma storms with excessive precipitation to minor developments with small amounts. The o graphic influences are represented by a generalized topography obtained by smoothing, and t incorporation of the effects of orography and released latent heat are found to lead to consid able improvements of the computed rainfall. On the whole, the computed patterns of rain agree well with those observed. The major deviations are found to be due to convect currents superimposed upon the large-scale motion. *Subject Headings:* **1. Precipitation fo casting 2. Numerical forecasting.**—*Author's abstract.*

9.11–134 551.509.317:551.501.7:551.51

Burkova, M. V., **Analiz frontov na vertikal'nykh razrezakh.** [Frontal analysis w vertical cross sections.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 159–162. 2 ref **DLC**—Diagrams of the vertical structure of the atmosphere are more and more based up simultaneous soundings at a series of points along a chosen line. Two types of vertical sectio are obtained: one based on daily operational radiosonde and pibal observations; the other o combined system of vertical and horizontal aircraft soundings through a frontal cloud syst at different elevations. The first type of section is termed operational and the characteris of a new form of such sections and their construction are described. A form of vertical sectio in which pressure on a logarithmic scale as on an emagram, is used. The reference of operatio in the construction of vertical sections in analyzing fronts upon them involves the followi construction of an emagram for all stations situated along the line of the section; curves temperature and of dew point are drawn, simultaneous pibal observations are entered on t emagram. A vertical section is constructed simultaneously with the emagram. The weath of the stations along the line of the section is taken from weather maps. Weather determin from airplanes is entered at required altitudes for corresponding points of the section. T fronts and positions intercepted by a vertical plane of the section are determined. In analy of the emagram inversion, isothermy and layers with small temperature gradients are i vestigated. The individual layers of particular soundings are reduced to a single syste Finally, isotherms and isograms of specific humidity, and the clouds and precipitation, a drawn in. *Subject Headings:* **1. Vertical cross sections 2. Frontal analysis 3. Emagra 4. Vertical structure of the atmosphere.**—*I.L.D.*

9.11–135 551.509.3

§Cochrane, C. W. (*U. S. W. B., Wash., D. C.*), **The use of surface pressure and temperatu observations in upper-air analysis.** *Monthly Weather Review*, Wash., D. C., 85(3):69–8 March **1957.** 23 figs., 12 refs. **DWB, DLC**—A deepening Low in Texas on Nov. 24, 19 is selected as a case for studying the more complete use of surface pressures and temperatur in upper-air analysis. To supplement the 2100 CST sea level pressure data, significa pressures taken from station barograms for several hours preceding 2100 CST are correct for diurnal variation, reduced to sea level, and plotted at appropriate points along lines paral to the direction of movement of the Low. These additional pressures make it possible show the steep pressure gradient which caused the rapid pressure rise registered on some of t station barograms. By means of synthetic virtual temperature soundings, additional heigh are obtained for the 900 and 800 mb charts at points where surface data are available and at t same points where barogram data are used on the sea level map. These additional data make possible to show the steep geopotential gradient at upper levels corresponding to the ste pressure gradient at sea level. Geostrophic winds of 1000 kn or more are indicated by t steep gradient aloft but, by use of the equations of motion, it is found that the air does n remain under the influence of the steep gradient long enough to attain such speeds. *Subj Headings:* **1. Upper air analysis 2. Surface pressures 3. Surface temperatures 4. Pressu gradient 5. Texas.**—*Author's abstract.*

9.11–136 551.509.317:551.515.8

§Jordan, Harold M. and Clark, John R. (*both, Natl. Wea. Analysis Center, U. S. W. B., Wash., D. C.*), **Analysis of frontal boundaries by means of thickness anomalies, November 12–16, 1956.** *Monthly Weather Review*, Wash., D. C., 84(11):415–419, Nov. 1956. 5 figs., 1 refs. **DWB, DLC**—A synoptic case history study for the western U. S. for Nov. 12–16, 1956, a time when a strong climatological temp. gradient masks the frontal "thickness gradients," thus making difficulties for the analyst who wishes to use the 1000–500 mb thickness gradient discontinuities as criteria for locating the fronts and indicating their intensities. *Subject Headings:* **1. Synoptic case histories 2. Thickness anomalies 3. Frontal analysis.**—*M.R.*

9.11–137 551.509.317:551.557.5(52)

Nakamura, S. and Arai, E. (*both, Aerological Section, J. M. A.*), **An upper air wind analysis during the later stage of "Bai-u" in 1952.** *Tateno, Japan. Aerological Observatory, Journal*, (1):9–16, Jan. 1957. 11 figs., 4 refs. In Japanese; English summary p. 9. **DLC**—Using the microfilms of Northern Hemispheric upper charts prepared by U.S.A.F., upper wind situations at the end of the rainy season in Japan (called "Bai-u") are analyzed. Chiefly the meridional analysis of connection between semi-stationary 1000 mb front, called "Bai-u front," and jet stream at 200 mb level are performed, and the following results are obtained: 1) There are two jet stream zones at 200 mb level over Japan and Siberia in summer, and the one is located at about 40°N and the other about 70°N; 2) The position of Bai-u front is along southern jet stream zone, and the rise and fall of Bai-u front connects closely with those of the jet stream; 3) At the later stage of this rainy season, remarkable upper phenomenon are observed, as follows: A) as the southern jet stream moves southward and weakens, the Bai-u front moves southward and vanishes; B) when the easterlies begin to prevail over Japan and surrounding areas, the Japanese rainy season is over and summer time comes; C) on the other hand, the northern jet stream zone, whose mean position is about 70°N, moves southward and stays about 50°N. *Subject Headings:* **1. Synoptic aerological studies 2. Jet stream analysis 3. Bai-u 4. Japan.**—*Authors' abstract.*

9.11–138 551.509.312

Adem, Julian, **Una solución en serie para la ecuación barotrópica de vorticidad y sus aplicaciones en el estudio de vortices atmosféricos.** [Series solution for the barotropic equation of vorticity and its applications in the study of atmospheric vortices.] *Mexico (City). Universidad Nacional. Instituto de Geofísica, Anales*, 2:1–19, 1956. 4 figs., table, 4 refs., 15 eqs. **DWB** (551 M6111an), **DLC** (QC801.M4)—A method to obtain a series solution for the barotropic nondivergent, vorticity equation is given and is applied to the case of a vortex. A formula that gives the development of a symmetrical vortex as a function of radius, maximum velocity and latitude is obtained. A numerical example is worked out. The convergence of the series solution for the general case is discussed and shown to depend on the scale of motion to be forecast, and conclusions are drawn regarding time-steps used in a forecast and the smoothing of the initial map. The possibility of improving a forecast and reducing the number of time-steps used in it by the application of this series solution follows as a general conclusion. Finally, a theorem that gives the scaling of the variables in an experimental model of a barotropic flow is obtained. *Subject Headings:* **1. Numerical forecasting 2. Barotropic vorticity equations.**—*Author's abstract.*

9.11–139 551.509.312:519.241.1

Dunn, Carlos R. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*), **Automatic incorporation of numerical short-range prognoses in 5-day circulation forecasts.** *Monthly Weather Review*, Wash., D. C., 86(2):45–52, Feb. 1958. 3 figs., 2 tables, 8 refs., 5 eqs. **DWB, DLC**—One of the basic aids in the preparation of extended forecasts is a 5-day mean mid-tropospheric chart centered on the day of the forecast, with associated instantaneous height tendencies, the unknown data being computed by autocorrelation techniques. Substitution of values from the barotropic 24-hr and 48-hr numerical prognoses for these unknowns objectively incorporated recent gains in short-period prognoses. Comparison of the statistically and physically computed mean charts and their tendencies suggests superiority of the latter over North America and the Atlantic, but not over the Pacific where errors in the barotropic prognoses,

which are probably due to improper boundary assumptions and omitted physical process play an important role. Dynamic considerations can be applied to the new mean chart suggest subsequent changes which may not be indicated kinematically. *Subject Headin* **1. Extended forecasting 2. Autocorrelation techniques 3. Barotropic tendency computatio** —*Author's abstract.*

9.11–140 551.509.5:551.5

Arden, R. S. and Milne, J. A. S. (*both, Ontario Hydro, Toronto, Canada*), **The experien of Ontario Hydro in forecasting runoff in Ontario.** *Eastern Snow Conference, 1956 and 19 Proceedings*, Vol. 4:104–112, pub. **1957.** 6 figs. **DWB** (M06 E14p)—The methods a procedures used in Ontario (Can.) for forecasting runoff for the purpose of storage-reserv operation and data analysis techniques are described, and the results of a forecast for t Madawaska River watershed are discussed. The forecasts are based on a mathematic analysis of the relation between past precipitation, snow survey data, and runoff for a minimu of 30 yrs of records from a large number of stations, and 5 forecast values (media, quartile and extremes) are determined. The weighted mean of snow survey data is calculated a combined with effective precipitation (computed by multiple linear correlations betwe various seasonal totals of runoff) by replacing one of the months of effective precipitation b the weighted mean water content of the following month. Investigations in the Madawask watershed suggest that the results of the March 1 snow survey are the best indication of Apr plus May runoff. When snow is combined with effective precipitation and a precipitatio snow index is computed, the resulting plot of the index versus April plus May runoff shows close fit. Data are graphed showing the March 1 snow-water equivalent as plotted against t April plus May runoff, observed and estimated runoff based on snow plus precipitation f 1943–1955, and estimated runoff based on precipitation alone and on precipitation plus snow *Subject Headings:* **1. Runoff forecasting 2. Forecasting techniques 3. Ontario, Canada.**— *SIPRE Abstract No. 14965.*

9.11–141 551.509.52:551.509.313:551.515.

Birchfield, Gene E., **Numerical prediction of hurricane movement with the use of a fin grid.** Chicago Univ. Dept. of Meteorology, Contract Cwb 9016, Technical Report No. 4 March **1957.** 14 p. 9 figs., table, 8 refs. **DWB** (M15.2 C532te)—A numerical model described for integrating the barotropic prediction equations to obtain forecasts of the displac ment of a hurricane center. The model employs a fine grid which is centered over the hurrican and covers only the vortex circulation. Forecasts for "Connie" and "Diane" (1955) a presented. Although these gradient-wind forecasts do not show any significant improvemen over the geostrophic forecasts, it is believed that the use of a stream function for the tota wind field should make an improvement in the predictions, particularly on relatively smal scale disturbances. *Subject Headings:* **1. Hurricane movement forecasting 2. Numerica hurricane forecasting.**—*Author's abstract.*

9.11–142 551.509.52:550.342:534.2

Darbyshire, J. and Darbyshire, Mollie, **The refraction of microseisms on approachin the coast of the British Isles.** *Royal Astronomical Society Monthly Notices, Geophysica Supplement*, 7(6):301–307, Nov. **1957.** 4 figs., 2 tables, 8 refs. **DLC**—Refraction diagram are drawn for 6-sec microseisms when they approach the British Isles from the SW, WSW, W WNW and NW directions. Refraction diagrams are also drawn for 4-s and 8-s microseism approaching from a westerly direction. The diagrams show that all the westerly microseism are very much reduced. This effect is confirmed by measurement of the vertical componen of the microseisms due to 16 storms which occurred during the period 1945–53. *Subjec Headings:* **1. Microseism refraction 2. British Isles coast.**—*Authors' abstract.*

9.11–143 551.509.52:551.55

Garriock, A. (*Central Office, Melbourne*), **Forecasting upper winds.** *Australian Meteoro logical Magazine*, Melbourne, No. 19:1–14, Dec. **1957.** 4 figs., 8 tables, 3 refs. **DWB, DLC**— From a study of a series of specially analyzed charts, it is concluded that the standard vecto deviation of the errors in synoptic analysis of upper winds is generally less than 10 kn at th

) mb level but may be as high as 20 kn at the 300 and 200 mb levels. From a study of the curacy of 24 hr forecasts, it is concluded that the standard vector deviations of the errors upper wind forecasts are of magnitude comparable with the standard vector deviation of the erdiurnal change. *Subject Headings:* **1. Upper air wind forecasting 2. Standard vector viations.**—*Author's abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Sodium in atmos. over ocean** (Shuleĭkin), 9.11–78; **Satellite obs. & air density calculations** (Sterne, Schilling), 9.11–84; **Ventilation of living quarters** (Georgii), 9.11–284.

9.11–144 551.510(09) 551.1

Kuiper, Gerard P. (*Yerkes Obs., Univ. of Chicago*), **Origin, age and possible ultimate fate the earth.** (In: Bates, D. R., *(ed.)*, **The earth and its atmosphere.** N. Y., Basic Books, 57. p. 12–30. **DLC**—The history of the atmosphere, as well as the oceans and continents, d of the solar system—the age of the earth (<6 billion yrs) as deduced from radioactive bstances in rocks and the atmosphere (A^{40} formed from K^{40} during the period of melting); om the rate of recession of the moon as a result of tidal friction (4 billion yrs); the salt me- bolism of the sea; the formation of plants, the earth, the early atmosphere and the possible timate fate of the earth—are discussed in a lucid style by the outstanding authority in this field. *ubject Headings:* **1. Origin of earth 2. Age of earth 3. History of earth's atmosphere.**—*M.R.*

9.11–145 551.510.4:551.593.55:523.38

Kozik, S. M., **Lunnye zatmeniia i zemnaia atmosfera.** [Lunar eclipses and the earth's tmosphere.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Ieteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 85–88. fig., 2 refs.) **DLC**— the earth lacked an atmosphere then during a total lunar eclipse the moon would be illu- inated by the weak light of the stars and would be almost invisible. It is shown that the ngth of the optical cone, where the refracted solar rays do not penetrate, is equal to COSEC °26′ = 40″ of the earth's radius, i.e., less than the distance to the moon. If the lower atmos- heric layer should become impenetrable owing to cloudiness then the length of the optical adow increases and the moon may become invisible during an eclipse. Atmospheric condi- ons also influence the positions of the boundaries of the earth's shadow on the moon. Evi- ence is obtained that at a height of several tens of kilometers the stratosphere over the equator warmer than over the poles. The character of the local and temporal variations of the mits of the earth's shadow are illustrated by means of a graph for the lunar eclipse of Aug. 5, 1943. *Subject Headings:* **1. Lunar eclipses 2. Atmospheric effects on eclipses 3. Earth's adow.**—*I.L.D.*

9.11–146 551.510.4:546.264:523.43 551.521.18:523.43

Shaw, J. H.; Burch, D. E. and Cummins, H. Z., **Near infrared spectrum of Mars.** Ohio. tate Univ. Research Foundation Contract AF 19(604)-1003, Scientific Report, No. 8, Nov. 957. 17 p. 5 figs., table, 8 refs. **DWB** (M21.6 037s)—Infrared spectra of Mars were btained in the autumn of 1956. From the intensity of the CO_2 bands near 1.6μ it has been stimated that the amount of CO_2 in the atmosphere of Mars is about four times greater than the earth's atmosphere if the surface pressure is 100 mb and the atmosphere is mostly com- osed of nitrogen. This is compared with a Martian CO_2 abundance of 13±4 times that of the rth's atmosphere obtained by GRANDJEAN and GOODY from the data of KUIPER. No vidence of bands of CO_2 (2.35μ) or N_2O (2.11, 2.26 and 3.94μ) was found, and upper limits of) atmo-cm have been placed on these gases. On one spectrum, indications of an absorption 3.5μ were obtained, in agreement with the results of SINTON. However, the detector failed efore confirmatory spectra could be obtained. *Subject Headings:* **1. Infrared spectra of Mars Carbon dioxide in the atmosphere of Mars 3. Mars.**—*Authors' abstract.*

9.11–147 551.51

Bates, D. R. (*Queen's Univ. of Belfast*), **Composition and structure of the atmosph** (In: Bates, D. R., (*ed.*), **The earth and its atmosphere,** N. Y., Basic Books, **1957.** p. 97– 2 figs., 2 tables.) **DLC**—The earth's atmosphere, its composition and structure, the i gases, CO_2 and minor constituents; pressure, density and temperature aloft as determi from rockets; composition and diffusive separation; heat balance, the nitrogen cycle, etc. discussed and illustrated by a few schematic diagrams. *Subject Headings:* **1. Atmosph structure 2. Atmospheric composition.**—*M.R.*

9.11–148 551.510.41:54

Zelikoff, Murray; Marmo, Frederick F. and Pressman, Jerome et al. (*all, G.R.D., CRC., Bedford, Mass.*), **An attempt to measure nitrogen by rocket release of ethylene at and 143 KM.** *Journal of Geophysical Research,* Wash., D. C., 63(1):31–37, March 19 3 tables, 13 refs., 2 eqs. **DLC**—Ethylene gas was released from a rocket at 105 and 143 in an attempt to detect atomic nitrogen in the upper atmosphere. The artificial che luminescence produced by the gas clouds was observed from the ground and recorded on Su Schmidt meteor cameras, using red-sensitive and blue-sensitive photographic plates. T color and intensity of each image can be related to the predominant chemical reaction produc the luminescence. The observations indicate that the lower cloud was caused by the react of ethylene and atomic nitrogen, and the upper cloud was caused by the reaction of ethyl with atomic oxygen. *Subject Headings:* **1. Nitrogen measurements 2. Atomic nitrogen upper atmosphere 3. Rocket observations. I. Manring, Edward R. II. Aschenbra Leonard M. III. Jursa, Adolph S.**—*Authors' abstract.*

ATMOSPHERIC POLLUTION

See also: **Indoor air pollution** (Buffault), **9.11–206**; **Vertical temp. profiles-air pollution relationships** (Jenne), **9.11–210.**

9.11–149 551.510

Davidson, B. and Halitsky, J. (*both, New York Univ.*), **A method of estimating the fi of instantaneous ground and concentration from tower bivane data.** *Air Pollution Con Association, Pittsburgh, Pa., Journal,* 7(4):316–319, Feb. **1958.** 8 figs., 8 eqs. **DWB, DLC** The Consolidated Edison Co. of New York sponsored an observation, from different elevatio of a strong wind flow over a 900 ft ridge at Buchanan. A cold smoke was emitted from elevated source. Consecutive photographs of its plume and segment centerlines were co pared with the predicted duration of the smoke on the ground. Results showed that t concentrations were sensitive to β values (β being half-slope in radians). *Subject Headin* **1. Atmospheric pollution measurements 2. Smoke plumes.**—*N.N.*

9.11–150 551.510.42:551.510.7:612.0

Gast, Paul F. (*Hanford Lab. G. E. Co., Richland, Wash.*), **Hanford experience in utilizi a meteorological staff in connection with atmospheric pollution problems.** *National Confere on Applied Meteorology, Hartford, Conn., Oct. 1957, Proceedings,* issued **1957.** Section C:9– **DWB** (M A512pro)—Atmospheric pollution problems arising from the operation of t Hanford Plant involve tolerance limits for radioactive materials which are many orders magnitude smaller than limits for the usual types of industrial pollutants. Two hazards a described as examples, one arising in routine operation and one which could result from major accident. *Subject Headings:* **1. Atmospheric pollution 2. Radioactive permissi dosage 3. Hanford, Wash.**—*From author's abstract.*

9.11–151 551.510.42:551.510.7:539.

Hilst, Glenn R. (*Hanford Lab. G. E. Co., Richland, Wash.*), **Meteorological phases of pollution problems associated with the operation of the Hanford works.** *National Confere on Applied Meteorology, Hartford, Conn., October 1957, Proceedings,* issued **1957.** Secti C-1–7. **DWB** (M A512pro)—The operation and maintenance of a large energy plant, su as the Hanford Works, inevitably entails the problem of atmospheric disposal of radioacti

:ol toxic wastes. The contributions of meteorological knowledge and services to the successful ution of the problem of economical and safe use of the atmosphere for routine disposal of eous wastes at Hanford are reviewed. The observational systems and methods for early rning and operational guidance in the case of an untoward large-scale release of contaminants described and evaluated briefly. *Subject Headings:* **1. Radioactive waste disposal 2. Atospheric pollution 3. Hanford, Wash.**—*From author's abstract.*

9.11–152 551.510.42:546.22

Itoo, K.; Moriguchi, M. and Naruse, H. (*all, Met. Research Inst.*), **Atmospheric SO_2 ncentration observed in Tokyo and its relation to meteorological elements. (On atmospheric llution, Pt. 1).** *Papers in Meteorology and Geophysics*, Tokyo, 6(1):19–25, May **1955.** 10 s., 5 tables, 5 refs., eq. **DWB**—In order to examine atmospheric contamination, we obved the concentration of sulfur dioxide. From Jan. 18th, 1955, through the 24th, we served 5 times per day at 7 localities in Tokyo Prefecture. The result of our observation d its relation to meteorological elements are given. *Subject Headings:* **1. Atmospheric llution 2. Sulfur dioxide in the atmosphere 3. Tokyo, Japan.**—*From authors' abstract.*

9.11–153 551.510.42

Klug, W., **Bisherige Theorien der Staubausbreitung.** [Available theories of dust opagation.] *Beiträge zur Physik der Atmosphäre*, Frankfurt, a.M., 30(2/3):137–142, **1958.** figs., table, 12 refs., eqs. English and French summaries p. 137. **DWB, DLC**—Theories the diffusion of stack effluents developed since ROBERTS (1923) are briefly reviewed. SUTON's formula based on statistical turbulence theory is explained. A differential equation eveloped by H. KOSCHMIEDER for inversion situations is developed and plans are announced r its verification. The difficulties of comparing theoretical concentration values with easured amounts are discussed. *Subject Headings:* **1. Atmospheric pollution 2. Stack effluent iffusion 3. Inversion effects on atmospheric pollution.**—*G.T.*

9.11–154 551.510.42:551.511.6:551.551

Smith, F. B., **Convection-diffusion processes below a stable layer, Pt. 2.** *Porton, England. hemical Defence Experimental Establishment, Porton Technical Paper*, No. 619, Oct. 9, **1957.** 1 p. 5 figs., 43 eqs. **DWB**—Part of a previous paper (*see Great Britain. Meteorological Research Committee, M.R.P.*, 1048, March 28, **1957.** 16 p. 8 figs., 7 refs., 56 eqs.). Pt. I ealt with the dual effect of convection and normal turbulent diffusion on the dispersal of an mittant from a ground level crosswind line source into an atmosphere of finite depth. The onvection was represented directly in an independent way from that of turbulent diffusion. he latter was represented by the usual diffusion coefficient $K(z)$. The model given in Pt. II s an extension of Pt. I, it being improved in two main respects. Firstly, the possible forms hat $K(z)$ can take are altered from the previous form $K=k(H-z)$ to the family $K=kz^{-\alpha}$. uggestions are made for generalizing possible values of $K(z)$ still further. Secondly, entrainent from the environment into the ascending convective motions is accounted for by an mpirical relation for the velocity of environmental subsidence. A comparison between he improved model and the previous one is made for $K(z)=k(H-z)$. *Subject Headings:* **1. Atmospheric pollution calculation 2. Convection-diffusion processes 3. Diffusion equations.** —*Author's abstract.*

9.11–155 551.510.42

Strom, Gordon H. (*Coll. of Eng., N. Y. Univ.*), **The application of wind tunnel model echniques in the solution of industrial air pollution problems.** *National Conference on Applied Meteorology, Hartford, Conn., Oct.* 1957, *Proceedings*, issued **1957.** Section C:24–32. 3 refs., figs. **DWB** (M A512 pro)—Scale model wind tunnel techniques have supplied solutions to ir pollution problems of industrial plants in the form of modifications to plant design and perating characteristics. Application of scale model results is limited by knowledge of ollution tolerance levels. The type of problems investigated are limited to those in which hermal characteristics of the atmosphere are not significant to the physical phenomena nvolved. A case history of two wind tunnel investigations conducted on the Avon Power lant of the Cleveland Electric Illuminating Co. illustrates the form and application of wind

tunnel results. *Subject Headings:* 1. **Atmospheric pollution control** 2. **Wind tunnel exp ments** 3. **Avon, Ohio.**—*Author's abstract.*

9.11–156 551.51

Tyler, Richard G., **Report on an air pollution study for City of Seattle.** Environme Research Laboratory, Univ. of Washington, March 15, 1952. 48 p. 46 figs. (incl. phot 8 tables, foot-refs. **DLC** (RA576.W3)—A report on the investigations and recommendati made respecting the reduction in air pollution in Seattle and vicinity. Although not as ser a problem as in the Los Angeles area, there were 2 periods during this study (Feb. and N 1951) when inversions persisted for 5 or 6 days, and on 2 days (March 28–29, 1952) the was darkened all day by smog. Sampling procedures involving 27 two-gallon dust fall j evenly distributed as shown on map of city; Seitz air filters, reflectance readings of filter di microphotographs (15,000–20,000 enlargement) and spot sampling are described and illustra and data presented in tables, charts and graphs. Meteorological factors are analyzed fu dispersion, diffusion, stability, inversions, wind direction and speed, sunshine, and l peculiarities due to hills, lakes and Puget Sound. Residential contribution, automo factory, pollen, radiometric and fluoride analysis are treated, and numerous ground or ae photos of various sections under various atmospheric conditions presented. Conclusions that smoke is principal pollutant, that meteorological conditions are of primary importa (topography also is important), that average dust fall of 27.5 tons per sq mi equals that Los Angeles, and that a decrease in sunlight is serious (comparison between city and Seat Tacoma airport) in a region where sunlight is already deficient. *Subject Headings:* 1. **Atm pheric pollution studies** 2. **Seattle, Wash.** I. **Washington (State). Univ. Environmen Research Laboratory.**—*M.R.*

9.11–157 551.510.42:582

Vlodavets, V. V., **Plesnevye griby v atmosfernom vozdukhe Moskvy.** [Mold fungi in t air of Moscow.] *Priroda*, Moscow, 45(12):95–97, Dec. **1956.** 3 figs. (incl. photos). **DLC** The results of a study of the qualitative and quantitative content of mold fungi in the air Moscow, carried out during 1955, are presented. Air samples were taken twice a week betwe 0200 and 0300 h at 120 cm above the earth's surface. The sampling procedure, cultivati of the fungi, etc. are described in detail. A graph giving the monthly frequency of mold fu and photographs of Petri dishes with the mold cultures are presented. The most frequen present molds belonged to the genus *Cladvsporidium Penicillium Alternaria* and *Aspergill* Also, the different seasons vary quantitatively and qualitatively in the mold fungi content the air. *Subject Headings:* 1. **Atmospheric mold fungi** 2. **Moscow, U.S.S.R.**—*I.L.D.*

STRUCTURE OF THE ATMOSPHERE

See also: **Antarctic circulation & tropopause charts** (Rastorguev), 9.11–58; **Trop. radio wave propagation** (Barsis), 9.11–167.

9.11–158 551.510.5:551.521.

Kondrat'ev, K. Ia. and Iastrebova, T. K., **K voprosu o vliianii stratifikatsii na teplov izluchenie atmosfery.** [Effect of stratification on the thermal radiation of the atmosphere *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 6:831–833, June **1957.** 2 figs., 4 refs., eqs. **DLC**—An analysis of the effect of atmospheric stratification upon its heat radiatio In order to estimate the influence exerted on heat radiation by the widening of the spectr lines resulting from molecular collisions, the actual water vapor content in different atmosphe layers is replaced by a water vapor content computed by the formula

$$w = z\int_0 \rho_\omega(z) f^0(p)\,dz,$$

where $\rho_\omega(z)$—absolute humidity at height z; $f(p)$—a function of atmospheric pressure p. T function $f(p)$ is represented by $f(p)=p/p_0$ or $f(p)=\sqrt{p/p_0}$. The effect of pressure correctio in these functions and the differences in values of w and in radiation flux resulting from the u of these equations of $f(p)$ are analyzed. Correction for pressure in both expressions of $f($

uces the assumed water vapor content relative to the actual content. Corrections for ssure reduce counter radiation and increase effective radiation with either expression for). Variations of counter radiation and effective radiation resulting from horizontal in- nogeneity of the atmosphere in different air masses are so small that they cannot be com- ted by a nomogram. Graphs showing the relationship of relative counter radiation to e atmospheric pressure and to atmospheric pressure at the earth's surface are presented. *bject Headings:* **1. Stratification of the atmosphere 2. Stratification effects on thermal diation 3. Thermal radiation.**—*I.L.D.*

9.11–159 551.510.5:551.510.3:551.507.362.2

Sterne, T. E.; Folkart, B. M. and Schilling, G. F. (*all, Astrophysical Obs., Smithsonian st.*), **An interim model atmosphere fitted to preliminary densities inferred from U.S.S.R. tellites.** *Smithsonian Institution. Astrophysical Observatory, IGY Project No.* 30.10, *ecial Report*, No. 7, Dec. 31, **1957.** 8 p. 3 figs., 7 refs., 8 eqs. **DWB.** Also issued in dited form" as *Smithsonian Contributions to Astrophysics*, Wash., D. C., 2(10):275–279, **1958.** **WB, DLC**—As earlier reported, preliminary values of the atmospheric density have been ferred from observations of artificial U.S.S.R. earth satellites. Those densities were greater an the densities predicted by most existing atmospheric models at corresponding altitudes. he present paper presents an interim and highly tentative atmospheric model adjusted to be e same as the ARDC model atmosphere, devised by MINZNER and RIPLEY, at altitudes low about 90 km, and to agree with the densities inferred from the satellites at an altitude 220 km (4.5×10^{-10} kg/M^3 or 8.7 times the density predicted by MINZNER and RIPLEY.) though this model is crude and only roughly approximate, it may be of use in predicting e life-times of new earth satellites. *Subject Headings:* **1. Atmospheric models 2. Air density lculations 3. Satellite observations.**—*Authors' abstract.*

9.11–160 551.510.5

†Williams, D. T.; Bell, J. C. (*both, Battelle Memorial Inst.*) and Nash, W. F. (*Aircraft Lab.*), **new standard atmosphere: the WADC 1952 model atmosphere.** U. S. Wright Air Develop- ent Center, Contract AF 33(616)82, WADC Technical Report, 54-215, March **1954.** 48 p. figs., tables, 34 refs., eqs. **DWB** (M10.5 U582n)—This detailed standard atmosphere from a level to 140,000 ft (42,000 m) was worked out in 1952 by Battelle Memorial Institute, olumbus, Ohio, with the help of the Bureau of Standards and the Weather Bureau and the onsorship of the Wright Air Development Center (WADC) Instruments Branch. The ACA-ICAD constants were used as the basis for this standard atmosphere which is con- dered to be more self-consistent and to extend higher than previously accepted models. onstants, theoretical calculations, detailed tables in metric and English units and nomo- ams of variations of temp., pressure, density, speed of sound, viscosity, and air speed with titude, Mach number, etc. are given. Variations from the "standard" are minimized in the iscussion. *Subject Heading:* **1. WADC standard atmosphere.**—*M.R.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Polar atmos. symposium, Oslo, Sweden,** 9.11–1; **Rocket exploration of upper atmosphere** (Link, Neužil), 9.11–9; **Ionosphere texts** (Rawer), 9.11–13; **Ionospheric research reports, India,** 9.11–32; **High alt. flying forecast manuals,** 9.11–33; **Ionospheric sounding data, Macquarie Is.** (Cohen), 9.11–57; **Ionospheric turbulence** (Booker), 9.11–217.

9.11–161 551.510.53:551.511

Fleagle, Robert G. (*Univ. of Washington, Seattle*), **Inferences concerning the dynamics of e mesosphere.** *Journal of Geophysical Research*, Wash., D. C., 63(1):137–146, March **1958.** figs., 13 refs., 5 eqs. **DLC**—In earlier work, the development of large scale atmospheric isturbances has been shown to depend in an explicit manner on horizontal density gradient, atic stability, latitude, and dimensions of the disturbance. This theoretical analysis is eneralized by eliminating the dimensions of the disturbance. The result is verified by mparing theory with tropospheric observations; then, on a reasonable postulate, the theory

is applied to determination of the instability of small disturbances in the region betw heights of 20 and 80 km, the mesosphere. The results indicate that in the statically sta mesoincline, large-amplitude disturbances are limited to the polar regions and must deve slowly. In the statically less-stable mesodecline, disturbances are also limited to the mid and high latitudes, but they may grow much more rapidly. The marked selectivity which troposphere exhibits for disturbances three to five thousand km in length occurs in the m decline in winter, but in summer there is only very weak preference for a wave number of at about 65° lat. It is inferred that summer disturbances in the mesodecline probably deve more rapidly than do disturbances in the troposphere, but that they undergo rapid change form and size, so that they may quickly lose their identity. *Subject Headings:* **1. Dynam of the mesosphere 2. Instability 3. Atmospheric disturbances.**—*Author's abstract.*

9.11–162 551.510.535:546.33:535

Bedinger, J. F.; Manring, E. R. and Ghosh, S. N. (*all, G.R.D., AFCRC, Bedford, Mas* **Study of sodium vapor ejected into the upper atmosphere.** *Journal of Geophysical Resear* Wash., D. C., 63(1):19–29, March **1958.** 4 figs., 3 tables, 15 refs., 8 eqs. **DLC**—Two Aero rockets were employed to eject relatively large amounts of sodium vapor into the eart atmosphere. One of the flights occurred during evening twilight and sodium was placed the sunlit atmosphere from 75 to 110 km. Sodium D line emission (λ5890 A was observed the ejected trail above 90 km, and 5890 A is discussed in terms of resonance)scattering of so radiation. Below 90 km, D line radiation was not apparent, and the trail was white in appe ance. This requires the formation of aerosols and indicates that sodium is unlikely to rem in the atomic state below 90 km. The second flight occurred at night. Strong D line emiss and a persistent trail were observed in terms of chemical processes which have been propos to explain the sodium airglow. These processes cannot produce the observed brightness the trail at the high altitudes. Excited atomic nitrogen (N^2D) is proposed as a possi source of the energy. The observed presence of large amounts of energy stored in the eart atmosphere above 100 km requires revision of some of the proposals regarding the sodiu airglow and its origin. *Subject Headings:* **1. Sodium in upper atmosphere 2. Sodium airgl 3. Sodium D line emission.**—*Authors' abstract.*

9.11–163 551.510.535:621.396.8:52

Briggs, B. H. (*Cavendish Lab., Cambridge*), **A study of the ionospheric irregularities whi cause spread-*F* echoes and scintillations of radio stars.** *Journal of Atmospheric and Terrestr Physics*, London, 12(1):34–45, **1958.** 5 figs., 4 tables, 22 refs. **DLC**—A study is made of t correlation between the occurrence of spread F echoes at Slough, Inverness and Oslo. It concluded that the ionospheric irregularities which cause the spreading occur in patches whi have dimensions of the order of 500 km in a NS direction, and considerably greater in the E direction. There is an indication that these "bands" of irregularities may lie along lines magnetic latitude, and the fact that they tend to occur in the same geographical position successive nights at two places is investigated. The results are found to be consistent with t same picture of the spatial distribution of the irregularities causing the scintillations whi are at heights near 300 km. *Subject Headings:* **1. Spread F echoes 2. Radio star scintillati 3. Ionospheric structure.**—*Author's abstract.*

9.11–164 523.75:551.510.5

'Bubble' on the Sun. *Science and Culture*, Calcutta, 21(11):664–665, May **1956. DLC** Motion picture photographs of the huge solar flare of Feb. 10, 1956 (equal to 100 million bombs) were shown at Columbus, Ohio to American Astronomical Society by scientists fr Sacramento Peak Observatory, N. Mex. The 20,000 mi bubble shot out 200,000 mi at 7 miles/sec, setting a record for solar flares. Most of the gas was hydrogen. Ultraviolet lig from flare affected the ionosphere and radio transmission. *Subject Heading:* **1. Solar fla effects on ionosphere.**—*M.R.*

9.11–165 551.510.535:551.510.

Budden, K. G. (*High Altitude Obs., Colo. Univ.*), **Method of calculating waveguide mo characteristics when the ionosphere is not sharply bounded.** *U. S. National Bureau of Stan*

...s, NBS Report, 5050, March 15, 1957. 9 p. 6 refs., 22 eqs. **DWB**—When discussing the ...opagation of very low frequency radio waves to great distances, it is convenient to treat the ...ace between the earth and the ionosphere as a wave guide. A method is described for ...lculating the characteristics of the wave guide modes when the electron density and collision ...quency vary continuously with height in any specified way. The method is given for the ...se when the electric field of the wave is in the plane of incidence, but it could be applied ...o to horizontally polarized waves. The earth's magnetic field is neglected, but a possible ...tension of the method to include the effect of the earth's field is described. *Subject Headings:* ... **Radio wave propagation 2. Wave guides.**—*Author's abstract.*

9.11–166 551.510.535:551.594.13

Jackson, J. E.; Kane, J. A. and Seddon, J. C., **Ionosphere electron-density measurements ...th the Navy Aerobee-Hi rocket.** *Journal of Geophysical Research*, Wash., D. C., 61(4):749–...1, Dec. 1956. 4 refs. Also: Jackson, John E. and Seddon, J. Carl, **Ionosphere electron-...nsity measurements with the Navy Aerobee-Hi rocket.** *Ibid.*, 63(1):197–208, March 1958. ... figs., table, 9 refs., 2 eqs. **DLC**—In the first report, electron densities were measured at ...hite Sands, N. Mex., continuously from the E region up to the lower F_2 region. This was ...ne by measuring the Doppler shift in a 7.75 Mc signal from the rocket. The electron ...nsities measured were:

Ht (km)	85	100	150	240	260
Electrons/cc	10^4	16×10^4	28×10^4	28×10^4	36×10^4

...lectron densities measured on this flight (June 1956) were about 50% greater above 100 km ...an those on the flight of May 1954. This is in accord with the greater solar activity since ...954. In the second report, electron densities in the ionosphere above White Sands were ...easured continuously from the E region up to the lower F_2 region with Aerobee-Hi NRL-50, ... rocket instrumented by the U.S.N.R.L. The results confirm the general structure of the ...aytime ionosphere above White Sands as deduced from previous NRL flights, namely, that ...he ionosphere remains dense between the E and F_2 regions, with only minor valleys in the ...lectron-density profiles. The electron-density distribution is shown to be consistent with ...he P′-f records obtained during the rocket flight. The sporadic-E condition, seen on these ...nograms, was found to be associated with a sharp spike in the electron-density profile at an ...ltitude of 101 km and approximately 1 km thick. This sporadic condition extended over a ...orizontal distance of at least 80 km. *Subject Headings:* **1. Ionospheric electron-density ... Sporadic E layer (E_S) 3. Rocket observation techniques.**—*S.F., Authors' abstract.*

WEATHER EFFECTS ON RADIO PROPAGATION

See also: **Method of calculating wave guide mode characteristics** (Budden), 9.11–165.

9.11–167 551.510.62:551.510.52:621.396

Barsis, Albrecht P., **Long distance tropospheric propagation measurements between North ...frica and Spain, Pt. 2, Results of the measurements.** *U. S. National Bureau of Standards, ...BS Report*, No. 5524, Oct. 15, 1957. 27 p. 8 figs., tables, 10 refs. **DWB** (621.384 U585Lo)—This report contains the results of path loss tests performed over a distance of approximately ...00 mi between locations in Morocco and in Spain. Frequencies used were 100 Mc and 1046 ...Mc, and measurements were made continuously during a ten-day period in Jan., 1957, and a ...5-day period in Feb., 1957. The data were analyzed to produce cumulative distributions of ...ourly median basic transmission loss values, and their dependence on meteorological param-...ters. Results show that the operationally important median values of received field strength ...xceeded during 99% of all hours were not substantially different for the two recording periods, ...lthough there were significant differences for the 50% and 1% values, probably due to the ...hange in transmission location. A number of height gain experiments on 100 Mc showed ...ood agreement with values based on theoretical studies. Simultaneous measurements at two ...eceiving locations separated by approximately 15 mi showed little difference in the character-

istics of the received signal. No significant correlation was found between the results of radio measurements and available meteorological data in the form of refractive index pro and surface refractivity values. *Subject Headings:* **1. Tropospheric radio wave propaga 2. Radio transmission loss 3. North Africa 4. Spain.**—*Author's abstract.*

9.11–168 551.510.62:621.3

*Fuster, Arsenio, **Perturbaciones radioeléctricas de principio brusco observadas en estación receptora de Alcobendas (Madrid) de Transradio Española, S.A., durante el año 1** [Radioelectric disturbances with a sudden commencement observed at the receiving sta of transradio Española at Alcobendas (Madrid) during 1952.] *Urania*, Madrid, 38(233) 63, Jan./March **1953.** entirely tables. **DWB**—Date, time of commencement and of end direction affected, and relative intensity are tabulated for disturbances in radio recept observed in 1952. Notes on accompanying weather phenomena are added to some of entries. *Subject Heading:* **1. Radio reception.**—*G.T.*

9.11–169 551.510

Green, James W., **On the deduction of the refractive index profile of a stratified atmosph from radio field-strength measurements.** *Institute of Radio Engineers, N. Y., Proceedi* 38(1):80–88, Jan. **1950.** 9 figs., 8 refs., 7 eqs. **DLC**—This academic discussion of M FARLANE's theory concludes that, except for the possible exception of a limited frequency ra under linear lapse rate conditions, the method is too sensitive to permit application direc to experimental data. *Subject Headings:* **1. Radio refractive index 2. Radio field streng** —*W.N.*

9.11–170 551.510.62 621.39

Kühn, Udo, **Einjährige Feldstärkemessungen im UKW-Rundfunkband in Kolberg Berlin.** [One-year field strength measurements in the ultra short wave radio band at Kolb near Berlin.] *Geofisica Pura e Applicata*, Rome, 38: 157–168, **1957.** 13 figs., 12 refs. G man and English summaries. **DLC**—The results of field strength measurements over so propagation paths in the frequency range from 88–100 Mc are presented. On the avera the lowest field strength could be observed in June and Dec. There was found a correlati between the temperature gradient at inversions and the field strength when using the avera values of field strength and the single values. The correlation coefficient between the fi strength and the temperature gradient at the inversions is a function of the length of t propagation path. In the same way the amplitude of the daily variation of field streng depends on the length of the propagation path; the values being a maximum at a distance 200 to 300 km. With a coefficient of 0.49 there was found a good correlation between t field strength and the air pressure variation at ground level. As there also exists a correlati between the field strength and the temperature variations in the lower part of the troposphe a better correlation coefficient of 0.58 was found when comparing the field strength with the a pressure variation and the variation of the temperature at the 700 mb level. There are giv some diagrams of the field strength dependent upon the available air mass, the height of t 700 mb level a.o. Some diagrams present the fieldstrength variation with varying temperatu gradient on inversions. As to the fieldstrength variation with distance there was found curve which for more than 300 Km is somewhat below this curve that was measured by t Meteorological Observatory, Kühlungsborn. The curve showed somewhat higher valu compared with one curve which was published in a document of the U. S. presented at t CCIR Assembly in Warsaw in 1956. *Subject Headings:* **1. Radio field strength measuremen 2. Radio field strength variations 3. Kolberg, Germany.**—*Author's abstract.*

9.11–171 551.510.

Plank, Vernon G.; Cunningham, Robert M. and Campen, Charles F., Jr. (*all, G.R.L AFCRC*), **The refractive index structure of a cumulus boundary and implications concernin radio wave reflection.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26–28, 195 Proceedings*, pub. **1957.** p. 273–280. 5 figs., 3 tables, 4 refs., 3 eqs. **DWB** (M01.81 R124pc)– Refractive index measurements made during an aircraft pass through cumulus have be

yzed for the details of index fluctuation at the cloud boundary. The microstructure is ribed and an explanation suggested. A restrictive estimate of boundary region reflectivity btained, using current theory. *Subject Heading:* **1. Refractive index measurements.**—*hors' abstract.*

RADIOACTIVITY

See also: **Radioactive tracers** (Facy), 9.11–107; . . . (Machta), 9.11–108 and 109; **Radioactive measuring devices** (Blifford), 9.11–131; **Atmos. pollution from radioactivity, Hanford, Wash.** (Gast), 9.11–150; **Radioactive waste disposal, Hanford** (Hilst), 9.11–151.

9.11–172 551.510.7:551.511.3

Bolin, Bert (*International Met. Inst., Stockholm*), **The vertical distribution of radioactivity he atmosphere.** *International Geophysical Year, 1957/1958, Annals,* 5(IGY Instruction nual), Pt. 5:324–329, **1958.** fig., 5 refs. **DWB**—The exchange processes, horizontal and tical, in the atmosphere are considered in relation to its vertical structure and vertical ility. The largest amounts of radioactivity are brought into the troposphere where the st favorable conditions for vertical exchange exist. The average residence time of particles he atmosphere depends very much on the level at which they are introduced and on various teorological factors. Precipitation is very effective in cleaning the atmosphere. Measurents of radioactive fallout must be interpreted in relation to the structure of the atmosphere l the meteorological data. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Vertical hange 3. Vertical distribution of radioactivity in the atmosphere.**—*Author's abstract.*

9.11–173 551.510.7:551.577.7:551.557.2

Miyake, Y. (*Met. Res. Inst., Tokyo*), **Radioactivity as a tracer of air motions in the atsphere.** *International Geophysical Year, 1957/1958, Annals,* 5(IGY Instruction Manual), 5:360, **1958. DWB**—In Japan man-made radioactivity could be detected in rain water in the air about a week after the explosion tests in the Pacific, while it was about two or ee days in the case of Russian tests. The radioactivity originating from Nevada tests was en observed half a month after the explosion. Studies on the relation between the radioivity and air trajectories at higher level, exchange of air masses or passage of cyclones and ti-cyclones showed that airborne activity is a useful tool for tracing the air motion in the nosphere on a global scale. *Subject Headings:* **1. Radioactive tracers 2. Radioactive nwater 3. Air trajectory tracing.**—*Author's abstract.*

9.11–174 551.510.71

Miranda, H. A., Jr., **Radon content of the atmosphere in the New York area as measured th an improved technique.** *Journal of Atmospheric and Terrestrial Physics,* London, 11(3/4): 2–283, **1957.** 5 figs., 12 refs. **DLC.** Also issued as: Fordham Univ. Dept. of Physics, ntract AF 19(122)-409, Scientific Report, No. 7, Sept. 1, **1956.** 38 p. 8 figs., 5 tables, refs., eqs. Also: Hess, Victor and Miranda, H. A., Jr., **Final report under Fordham Univ. pt. of Physics,** Contract AF 19(122)-409, pub. **1956.** 8 p.—A method has been developed determining the radon concentration of the air, both at the ground, and in the upper nosphere, employing cocoanut charcoal as a concentrating agent. Comparison measurents for ground samples were carried out with the conventional methods, and show good reement over more than one order of magnitude. The method as adapted for upper air npling, is capable of measuring a radon concentration of 4.4×10^{-15} curie per liter. It has further advantage of being well suited for a synoptic type of investigation, since the npling procedure utilizes a minimum of flying time, and requires no special training for ose actually performing the sampling. Four determinations of the radon distribution with ght up to 10,000 ft were carried out, with a view to testing the feasibility of the method. rge and unexpected variations in radon concentration from one level to another were obved. It is also shown that de-emanation of a radium solution, when carried out in conuction with the new method, does not require boiling of the solution, nor operation at reduced ssure. *Subject Headings:* **1. Radon content of atmosphere 2. Radon measurement.**—*thor's abstract.*

9.11–175 551.510.72:662.2

Schumann, G. (*Zweites Physikalisches Inst., Univ. Heidelberg*), **The use of isotopes long half-lives to obtain the storage times and mixing rates of aerosols.** *International physical Year, 1957/1958, Annals*, 5(IGY Instruction Manual), Pt. 5:330–335, 1958. 4 4 refs. DWB—Experience based on a study of ^{210}Pb (RaD) and ^{90}Sr shows that the st time in the lower regions of the troposphere is of the order of days and in the stratosph of the order of years. The difference between the storage times in the two regions agree what is known qualitatively of vertical mixing. To obtain quantitative data concernin dependence of storage times on height and meteorological conditions, methods would ha be extended and the number of observations enlarged. Coordination of such measure with investigations on the chemistry of the atmosphere and of atmospheric aerosols pro a considerable improvement in our knowledge; coordination with measurements of atmosp electricity might also be valuable. An assessment of the changes of radiation at ground is obtained as an additional result. *Subject Headings:* **1. Radioactive isotopes 2. Stront stratospheric storage 3. Strontium^{90} tropospheric storage 4. Radioactive aerosols.**—*Au abstract.*

9.11–176 551.510.721:662.2:

U. S. Congress. House. Committee on Government Operations, **Civil defense national survival. July 27, 1956.** Washington, D. C., U. S. Govt. Print. Off., **1956.** 1 (84th Congress, 2d Session, House Report No. 2946, 1956.) **DWB** (355.232 U582c)—T hearings on civil defense planning include brief discussion (p. 7–12) of the destructive pow nuclear weapons, nuclear explosion effects, including effects of radioactive fallout, (testim of LIBBY) and effects of radiation. *Subject Headings:* **1. Civil defense 2. Radioactive fal** —*G.T.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Theoretical hydromechanics** (Kochin et al.), 9.11–7, 9.11–8; **Gravity wave analysis** (Reid, Kajiura), 9.11–80; **Radioactive tracers-vertical exchange relationships** (Machta), 9.11–108; **Convection-diffusion processes** (Smith), 9.11–154; **Dynamics of the mesosphere** (Fleagle), 9.11–161; **Vertical distribution of radioactivity** (Bolin), 9.11–172.

9.11–177 551.511:551.515.52:551.5

†Flohn, Hermann, **Studien zur Dynamik der äquatorialen Atmosphäre, I, Horizon und vertikale Windkomponenten auf dem Atlantik.** [Studies on dynamics of the equat atmosphere, Pt. 1, Horizontal and vertical wind components over the Atlantic.] *Beit zur Physik der Atmosphäre*, Frankfurt a.M., 30(1):18–46, **1957.** 14 figs., 6 tables, 32 r 11 eqs. German, French and English summaries p. 18. **DWB, DLC**—From 366,000 observations of the Atlantic between 10°N.–10°S., the author derives a high correla between zonal and vertical components of wind, as well as a weaker but significant correla between meridional and vertical components. Precipitation and cloudiness, as indica lifting, are linear functions of the divergence of surface winds. Between the intertrop convergence zone (ITC) and the equator, anticyclonic vorticity is predominating toge with strong convergence: this coincidence results from the persistent transport of nega vorticity—cyclonic from the viewpoint of the Southern Hemisphere—with the S.E.-Tr towards north, across the equator. From nearly 700 pilot balloon observations betwee and 15°N., the three-dimensional structure of wind on both sides of the meteorological equa (ITC) up to 5 kms is calculated, together with the vertical component of wind and the amo of precipitation. The asymmetry of wind field on both sides of ITC explains the typ pattern of precipitation as a narrow belt between meteorological and mathematical equa *Subject Headings:* **1. Horizontal wind components 2. Vertical wind components 3. In tropical convergence zone 4. Equatorial meteorology.**—*Author's abstract.*

9.11–178 551.511.33:551.513.1:551.50

Mitomo, S., **Relationship between the variation of total momentum over the North Hemisphere and the weather in Japan.** *Journal of Meteorological Research*, Tokyo, 9(6):4

July 1957. 4 figs. DWB—The author examined the variation of total momentum over Northern Hemisphere by using 5-day mean 500 mb chart, and obtained results are as ws: (1) The maximum of total momentum over the zonal belt with 10°-width is at about N. in winter, and at about 45°N. in summer. (2) The variation of total momentum and temperature has negative correlation except rainy season. (3) The variation of total mentum and precipitation amount in Japan has negative correlation in winter and positive elation in summer. *Subject Headings:* **1. Momentum transfer 2. Total momentum-ther relationships 3. Japan.**—*Author's abstract.*

9.11–179 551.511:551.558.1:536.25

Vul'fson, N. I. (*Geophys. Inst. Acad. Sci. U.S.S.R.*), **Metod izucheniia konvektivnykh cheniĭ v svobodnoĭ atmosfere.** [Method of investigating convective movements in the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 5:549–561, May 1956. igs. (incl. graphs and photos), 9 refs., eqs. **DLC**—The method of investigating convective vement of air in the free atmosphere is based upon the measurement of the temperature of ng air currents or bubbles by means of a thermometer installed on an airplane. The allation includes a potentiometric velocity and indicators of velocity and a statoscope the height of the flight, which provide data for correcting the measured excesses of tempera-e in the convection currents. The errors of the apparatus are examined and the precision the measurements is evaluated. The results of verifications of the method are presented; se demonstrate that the thermometer records the ascending currents. This method is plied to the study of convective movements in cumulus clouds in all stages of their develop-nt. (*See also* 5.7–85, July 1954, *MAB.*) *Subject Headings:* **1. Convective motion 2. Air-ne thermometers 3. Convection currents 4. Convective clouds.**—*Trans. from author's tract.*

9.11–180 551.511.2:551.511.32

Tilliashaĭkhova, R., **O primenenii nekotorykh teorem sokhraneniia k izucheniiu fiziki nosfery.** [Application of certain conservation theorems to the study of atmospheric ysics.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Me-rologiia i gidrologiia v Uzbekistane.** Tashkent, 1955. p. 121–125. table, 6 refs., 6 eqs.) **LC**—The analysis of the conservation of magnitude inherent in a physical process and of invariants is fundamental to understanding in a study of the physics of the atmosphere. om Ertel's fundamental vortex equation

$$\frac{d}{dt}(\zeta_a \nabla\psi) - (\zeta_a \nabla)\frac{d\psi}{dt} = \sigma \frac{\partial(\rho,\sigma,\psi)}{\partial(x,y,z)}$$

eorems of conservation can be obtained namely:

$$\frac{d}{dt}(\zeta_a \nabla\psi) = 0.$$

om this theorem several conditions of conservation applicable in hydrodynamics and me-rology can be derived. Thus if $\varphi = \theta$ (potential temperatures) CHARNEY's conservation eorem is obtained; also the deviation of ROSSBY's conservation theorem and V. J. GUBIN's $= T$ (absolute temperature) are presented. The form of the function $f(t)$ (for the condition $/dt = f(t)$) is illustrated for the specific case involving the change in temperature with time case of an air mass moving towards the continent from the Kara Sea. It is shown that in transformation of air masses on incursion from north to south the function $f(t)$ for 700 mb el can be chosen in the form of a polynomial of any degree. *Subject Headings:* **1. Atmospheric ysics 2. Ertel's vorticity theorem 3. Charney's vorticity conservation theorem 4. Rossby's nservation theorem.**—*I.L.D.*

9.11–181 551.511.33

†Burdecki, Feliks, **A study of the heat field of the atmosphere.** *Journal of Meteorology*, (3):206–234, June 1957. 8 figs., 24 tables, 61 refs., 25 eqs. DWB—From temperatures

for every 10° lat. for different levels, 1000–100 mb, total changes of heat are computed; analytic expressions for seasonal fluctuations are found for 10° rings. The concept of "potential" is introduced. Values of daily heating are calculated for 10° lat. and 10 mb l for each month. Considerable differences are found between N. and S. Hemispheres double seasonal rhythm is seen from 25°N. to 15°S. at 1000 mb, spreading to 45°N–. at 200 mb, and again in north polar regions. Two tropopauses at about 230 and 120 m southern part of north temperate zone are due to rhythms of lower and upper layers. concepts are then introduced—"heat potentials" (related to absolute zero or mean perature of whole atmosphere), "pseudo-constant of circulation" and "coefficient of cir tion"—and calculated. Relations of evaporation, precipitation and heat circulation are considered and a scheme for atmospheric circulation laid down. Differences between N. S. Hemispheres are explained. The so-called "Schmidt paradox" does not exist. The dominant factors in the fluctuating heat field are the heat of vaporization and the effect sudden release. *Subject Headings:* **1. Thermodynamics 2. Heat potential of atmosph** —*C.E.P.B.*

9.11–182 551.51

Kogan, S. Ia., **O metode rascheta advektivnogo pritoka tepla.** [A method of calcula the advective heat influx.] *Akademiia Nauk SSSR. Geofizicheskiĭ Institut, Trudy,* 37(164):132–141, **1956.** 2 figs., 2 tables, 3 refs., 3+eqs. **DLC**—The author develo method for calculating advective heat flow on the basis of an approximation of the tempera field within a small area around the point investigated by a surface of the second order. method has the advantage that all calculations can be made according to standard meth involving least squares and determinants and the result of the calculation does not de (within the limits of given accuracy—1 cal/m³ hour) upon the errors in wind direction wi limits of ±5°. Two examples of computing advective heat flow by the methods develo are presented. *Subject Heading:* **1. Advective heat flow calculations.**—*I.L.D.*

9.11–183 551.5

Tick, Leo J. (*New York Univ. Research Div., College of Engr.*), **Problems in the statist theory of turbulent diffusion.** (In: U. S. Dugway Proving Ground. **Symposium on mi meteorology turbulent diffusion, June 28–29, 1954. 1956.** p. 35–47. 5 refs., eqs.) **DW** The author discusses probability theories in connection with turbulent diffusion. The m concentration and the variance of concentration can also have a mean and a variance (and 4th "moments") and the processes can be described by Lagrangian or by Eulerian analy The two are the same only when the two types of processes or spectra have a Gaussian tribution, which is unusual. *Subject Heading:* **1. Turbulent diffusion theories.**—*M.R.*

9.11–184 551.511.6:551.58

†Wippermann, Friedrich, **Über den Einfluss der Orographie auf den meridionalen, mak turbulenten Impulstransport in der Atmosphäre.** [Influence of orography on the meridio macroturbulent momentum transport in the atmosphere.] *Germany. Deutscher Wetterdien Berichte,* 5(30), **1957.** 26 p. 11 figs., 2 tables, 43 refs., 78 eqs. Abstract in *Ibid.,* 5(38): **1957. DWB, DLC.** Trans. into English issued in: Germany. Deutscher Wetterdien **Studies in numerical forecasting (Technical (Final) Report** under Contract AF 61(514)-7350 pub. June 30, **1957.** Sec. Q (55 p.) 11 figs., 14 tables, 26 refs., 15 eqs.—A method is develo for calculating approximately the terms of turbulent transport of any quantity in meteorol studies concerned with the mean values of an atmospheric field by the successive ordering the turbulence terms into partial intervals of almost valid stationary conditions. It is nec sary to know only statistical measures of the temporal appearance of the turbulent quantit to be transported. The size of the partial intervals is 2–5 days. The calculation of tempo means of the heights of the 500 mb surface as influenced by orographic effect requires t evaluation of a term having the form $\overline{(v-1)^{\bar{v}} V^{\bar{v}}}$. With the procedure developed in this stu the height values with respect to this term are calculated for three different frequency d tributions of the zonal flow. In hemispherical investigations of the flow impulse the meridio macroturbulent transport of zonal movement $\overline{v^{\bar{v}} V^{\bar{v}}}$ must be considered. Also this magnitu

ılculated for different frequency distributions of the zonal flow v. By means of this pro- ıre it is not possible to calculate the planetary portions of this turbulent flow over a closed ıe of latitude, but only the orographically produced deviations from the planetary portion. *ject Headings:* **1. Meridional macroturbulent transport 2. Orographic influences.**—*Based uthor's abstract* (*I.L.D.*).

GENERAL CIRCULATION

See also: **Drought & summer rainfall anomalies, Germany** (Clauss), 9.11–16; **Antarctic circulation and tropopause charts** (Rastorguev), 9.11–58; **Total momentum-weather relationships** (Mitomo), 9.11–178; **Vertical velocity in jet stream** (Vuorela), 9.11–222; **Continental and oceanic influences on atmos.** (Johansen), 9.11–288.

9.11–185 551.513:551.515.11:551.515.8

Bugaev, V. A., **Planetarnye vysotnye frontal'nye zony i tsiklogenez.** [Planetary high- tude frontal zones and cyclogenesis.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut tematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 127– . 3 figs., 9 refs.) **DLC**—While the most intense cyclonic activity is observed in the region he planetary high altitude frontal zone, not all parts of this zone are cyclogenetic. A high tude large scale trough with a planetary high altitude frontal zone bending around it ves as the system of natural coordinates. Other troughs were combined with the funda- ntal trough regardless of whether the axes had a meridional or ultra-polar direction. But ll the troughs there is a common point of intersection of the axis of the trough and of the s planetary high altitude frontal zone so that the position of the cyclonic centers from other ughs can be superposed upon the fundamental trough. For a specific situation at AT_{500} r the Atlantic Ocean–Eurasia between 40°W. long. to 100°E. long. on March 30, 1951, author analyzes in detail the position of cyclonic and anticyclonic centers in the large scale ugh. The position of the jet stream axis and of the cyclone at various developmental ges are discussed with the aid of diagrams. The place of origin of wave disturbances in the ıthern third of a large scale trough indicates the position of the principle front of a given netary high altitude frontal zone. The part of the frontal zone which lies between the s of the large scale trough and the axis of the ridge to the right of it is the cyclogenetic part the planetary high altitude frontal zone. Strong anticyclonic development in other parts the zone occurs south of the trough. Cyclogenetic sections are not restricted to the anterior rt of a large scale trough. A characteristic macrosynoptic situation in which a series of clones and a concluding anticyclonic incursion is formed, the formation and destruction of h planetary frontal zones and their significance in short range forecasting are discussed. *bject Headings:* **1. Planetary high altitude frontal zones 2. Cyclonic activity.**—*I.L.D.*

9.11–186 551.511.33:551.513.1

Bjerknes, J., **The transfer of angular momentum in the atmosphere.** *I.U.G.G. Association Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 407– . **DWB**—"The angular momentum of atmospheric rings is controlled by exchange proc- es with neighbouring rings and with the earth. The exchange between adjacent rings can be ided into strictly horizontal exchange, carried by the geostrophic part of the motion, and the ageostrophic exchange, which includes as a special case the transfer of angular momentum vertical-meridional circulations." The author discusses briefly the evaluation of the geo- ophic exchange and the origin of the interdiurnal changes in angular momentum. *Subject ading:* **1. Angular momentum transfer.**—*From author's summary and I.L.D.*

9.11–187 551.513.2:551.557.5(6,262)

Lamb, H. H. and Robinson, J., **Forecasting weather in the Mediterranean.** *Meteorological gazine,* London, 86(1021):214–217, July **1957.** ref. **DWB**—Referring to their: **Jet eams over North Africa and the Central Mediterranean** (*see* 8.8–203, Aug. 1957, *MAB*), ne additional facts are given of interest to forecasters. *Subject Headings:* **1. Jet stream lysis 2. North Africa 3. Mediterranean.**—*C.E.P.B.*

9.11–188 551.513.2:551.557.5:551

Morley, K. T. (*Central Office, Melbourne*), **The use of a jet stream nomogram.** *Aust Meteorological Magazine*, Melbourne, No. 19:29–35, Dec. **1957.** fig., ref., eqs. **DWB, D** In an attempt to determine the horizontal structure of the jet stream, the U. S. Navy u took a series of aircraft traverses at 30,000 ft pressure altitude. The results were pub by RIEHL, BERRY and MAYNARD (*see* 6.5–123, May 1955, *MAB*) who constructed a t wind velocity profile through a jet core and suggested two empirical equations likely t a good fit for any jet stream. The graphical solutions of these equations were sketch R. H. CLARKE, formerly of Central Analysis Office, Bureau of Meteorology, as a nomo by which the velocity and position of the jet maximum could be obtained, given a su traverse of the jet from a wind on the cold side to a wind on the warm side. The nomo and its method of use are described here together with results of its application, and interim comments on its value in routine analysis. *Subject Headings:* **1. Jet stream nomog 2. Jet stream structure.**—*Author's abstract.*

9.11–189 551.513.2:551.

Palmén, Erik Herbert; Riehl, H. and Vuorela, L., **On the meridional circulation release of kinetic energy in the tropics.** *Journal of Meteorology*, 15(3):271–277, June 12 figs., 6 tables, 12 refs., 6 eqs. **DWB, DLC.** Also issued as: Chicago. Univ. Dep Meteorology, Contract N6ori-02036, Report on Research (unnumbered), Feb. **1957.** 12 figs., 4 tables, 6 eqs. **DWB**—Data from 47 stations between 8°N. and 36°N. for Dec. Feb. 1951 and Dec. 1951–Feb. 1952, for 1000, 950, 900, 800 and 700 mb are compiled in to determine the zonal, meridional and vertical flow of absolute angular momentum assoc with the mean meridional circulation and large scale eddies in the trade wind belt. numerical results are given in tables and on charts, profiles, graphs for various area, lat belts, pressure surfaces or parameters. *Subject Headings:* **1. Meridional circulation 2. T wind kinetic energy release 3. Absolute angular momentum flow 4. Trade wind belt.**—

9.11–190 551.513.2:551.551.5:551.

U. S. Bureau of Aeronautics (Navy), **Operational research into the detailed structu the jet stream.** Project AROWA (TED-UNL-MA-501.15), Technical Report, No. 2, **1955.** 59+14 p. 22 figs., 8 tables, 11 refs. **DWB**—During the 1953/1954 winter se Project AROWA conducted research flights into the polar jet stream for the purpose o taining detailed wind, clear air turbulence, and temperature data. This report cover strumentation, jet stream forecast procedures, flight summaries, data processing techni and analyzed results of the flights. The distribution of absolute vorticity and encoun temperature variations are discussed, along with the probability of occurrence of clea turbulence, its relation to horizontal temperature gradient, and spectral analysis of a lerometer data. Interesting flights which reveal unusual jet stream phenomenon are desc individually. Miscellaneous studies conducted include the correlation of jet stream maxi and 500 and 300 mb parameters, as well as vertical wind shear encountered. The condu of future research flights is recommended. *Subject Headings:* **1. Jet stream structure 2. C air turbulence 3. Jet stream forecasting.**—*Author's abstract.*

9.11–191 551.513.2:551.5

Vorontsov, P. A., **Nekotorye voprosy mestnykh tsirkuliatsii vozdukha.** [Problem local atmospheric circulations.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Tr* No. 54(116):59–77, **1955.** 16 figs., 7 tables, 10 refs., eqs. **DLC**—On the basis of exte aerological observations, the author analyzes the formation and characteristics of va types of local circulation. The criteria of a well developed local circulation are outli With the aid of numerical data, graphs and diagrams, the following types of local circula are discussed: "field-forest" circulation, circulation over unfrozen fiords during the winter, föhns of the Rhone Valley, the vertical air motion in föhn winds, height of descent of air ma during föhn, conditions for the formation of föhn in the Rhone Valley, the mountain-va circulation including periodic winds in a southern Georgia (U.S.S.R.) mountain-valley the circulation in the Azau-Baksan Valley and the distribution of temperature and humi with height. *Subject Headings:* **1. Local atmospheric circulation 2. Upper air observat 3. Föhn winds 4. Rhone Valley 5. Georgia, U.S.S.R.**—*I.L.D.*

ATMOSPHERIC DISTURBANCES

See also: **Numerical forecasting studies, Tokyo, 9.11–3; Drought & summer rainfall anomalies, Germany** (Clauss), **9.11–16; Hurricane season reports, Caribbean & Atlantic states, 9.11–28; Antarctic Ocean pressure data** (Hofmeyr), **9.11–49; Frontal analysis with vertical cross section** (Burkova), **9.11–134; Frontal analysis** (Jordan, Clark), **9.11–136; Hurricane movement forecasting** (Birchfield), **9.11–141; Frontal zones and cyclogenesis** (Bugaev), **9.11–185; Convergence line-typhoon precip. relationships** (Goto), **9.11–251.**

9.11–192 551.515.127:551.510.5(73)

Duquet, Robert T. and Spar, Jerome, **Some statistical characteristics of cyclones at 500 bars.** *Journal of Meteorology*, 14(3):251–260, June **1957.** 13 figs., 3 tables, 12 refs. B—Geographical distribution of 4300 500 mb cyclones by 5° squares was analyzed for 0°N. 45–145°W., 1 Dec. 1946–30 Nov. 1952. All cases (1264) of cyclogenesis were also d. Seasonal charts are reproduced, showing maxima of cyclones and cyclogenesis in g and fall. The 24-hour movement is northward in fall, eastward in winter and spring least in summer. Statistical characteristics of tracks are determined by season and region. *ect Headings:* **1. High level cyclones 2. United States.**—*C.E.P.B.*

9.11–193 551.515.127:551.509.3

Suda, Ken (*Japan Met. Agency, Tokyo*), **A large-scale upper level cyclone over eastern ria and its effect on the Far Eastern weather.** *Geophysical Magazine*, Tokyo, 28(1):9–20, . **1957.** 7 figs., 8 refs. **DWB, DLC**—In continuation of the previous report, another nounced case of the northeasterly situation which appeared in March 1955 is presented. dies based on Northern Hemisphere mean charts revealed again the significance of a large e upper level cyclone over Siberia as the primary cause of the persistent rain in Japan. mation and stagnation of the front along the southern coast of Japan is ascribed to the fluence of northwesterly and southwesterly currents due to the phase difference of the long e troughs in higher and lower latitudes. The northward shift of the track of moving cyclones characteristic of the northeasterly situation is explained by successive cold outaks, which take place in the western flank of the cutoff cyclone and are steered cyclonically nd it. Finally, the processes leading to the establishment of the northeasterly situation are marized. *Subject Headings:* **1. Synoptic studies 2. Upper level cyclones 3. Siberian ones 4. Japan.**—*Author's abstract.*

9.11–194 551.511.33:551.515.27

Pfeffer, Richard L. (*Mass. Inst. of Tech.*), **Concerning the mechanics of hurricanes.** *rnal of Meteorology*, 15(1):113–120, Feb. **1958.** 5 figs., 2 tables, 15 refs., 3 eqs. **DWB,** —The balance of angular momentum in the mature hurricane is examined quantitatively. s found that the cyclonic angular momentum which ultimately appears in the hurricane is introduced into the atmosphere within the circulation around each of the neighboring -pressure cells. From here it is transferred into the cyclonic core of the hurricane through agency of "horizontal-eddy" processes, which are characterized by mass exchanges in zontal planes. Such mass exchanges are identified with the so-called "Rossby regime" nvection. Within the cyclonic core of the hurricane, the angular momentum is transported rd through the agency of "vertical-eddy" processes, which are characterized by mass anges in vertical planes passing through the axis of rotation of the hurricane. Such s exchanges are identified with the "Hadley regime." The hurricane thus possesses acteristics of two distinctly different regimes of convection. (For abstract on this title another source, *see* 7I–185, Sept. 1956, *MAB.*) *Subject Heading:* **1. Hurricane dynamics.** *uthor's abstract.*

9.11–195 551.515.23(94)

Bath, A. T. (*Divisional Office, Brisbane*), **The Mackay cyclone of Jan. 21, 1918.** *Australian orological Magazine*, Melbourne, No. 19:46–59, Dec. **1957.** 7 figs., ref. **DWB, DLC**—A ription of the Mackay cyclone of Jan. 21, 1918 from the log of the Lightkeeper Flat Top d supplied by Capt. G. F. Long of the Company of Master Mariners of Australia, is

supplemented by extracts from records and charts held at the Brisbane Divisional Office Commonwealth Bureau of Meteorology. The cyclone track appearing in *Bureau of M ology, Bulletin*, No. 16, **Australian hurricanes and related storms** has been extended. *S Headings:* **1. Cyclone, Mackay (1918) 2. Cyclone tracks 3. Mackay, Australia.**—*Au abstract.*

9.11–196 551.515.2:551

Haque, S. M. A. (Dept. of Math., Dacca Univ.), **Mathematical model of flood waves tropical cyclones.** *Pakistan Journal of Scientific Research*, Lahore, 9(4):123–125, Oct. ref., eqs. **DWB, DLC**—It is assumed that water is deposited on the sea surface symmetri about a center, and the speeds of propagation of dynamic and kinematic waves on this m water are determined for large and small distances from the center under certain restr assumptions. It is argued that the model may be taken as a first approximation for waves from tropical cyclone centers and numerical estimates for a typical, tropical cyclon given. *Subject Headings:* **1. Flood wave models 2. Tropical cyclone waves.**—*Au abstract.*

9.11–197 551.515.2

Pisharoty, P. R. and Kulkarni, S. B. (*both, Met. Dept., India*), **Interaction between tr revolving storms on either side of the equator.** (In: Tropical Cyclone Symposium Bris Dec. 1956, **Proceedings.** Pub. Dec. 1956. p. 289–294. fig., 2 tables, 10 refs.) **DW** A few ideas regarding the possible interaction of tropical revolving storms on either side equator, when they exist within a comparatively narrow longitudinal belt, have been postu by MALURKAR. Two of the possible consequences of the interaction postulated are (1) w ening of one system and the simultaneous strengthening of the other, and (2) weakeni both the systems. The storms and depressions in the Bay of Bengal and the Arabian have been examined for a period of nearly 20 yrs, in relation to the nearly contemporary st in the South Indian Ocean west of 100°E. A similar examination has been carried ou the west Pacific for a limited period of three years, 1932–4. The examination support ideas of MALURKAR. Out of a total of 79 storms which weakened over the sea areas o Northern Hemisphere, 12 were associated with contemporaneous storms south of the equ within a longitudinal belt of 40°. There were two instances when storms north of the equ intensified and weakened-off pre-existing storms south of the equator. *Subject Head* **1. Tropical cyclones 2. Equatorial-cyclone interaction. I. Malurkar, S. L.**—*Authors' abs*

9.11–198 551.515.2

Reichelderfer, F. W., **Hurricanes, tornadoes, and other storms.** *American Aca of Political and Social Science, Annals*, 309:23–35, Jan. **1957.** 2 figs., 3 tables. **DW** Hurricane and tornado damage and other aspects of their occurrence in the U. S., are discu and the statements supported by statistical data and maps showing frequency of occurr The hurricane warning service, special observation program (radar and reconnaissance pla the National Hurricane Research Project, tornado and severe storm warning network, are covered insofar as U. S. Weather Bureau activities are involved. *Subject Head* **1. Hurricane research 2. Hurricane warnings 3. Tornado warning network 4. Torna 5. United States.**—*M.R.*

9.11–199 551.515.23:551.5

Takenaga, K. and Yamaguchi, K., **On the circular isobars of a typhoon deformed by mountain range.** *Journal of Meteorological Research*, Tokyo, 8(5):277–284, June **1956.** figs., table, 11 refs. In Japanese; English summary p. 277. **DWB, DLC**—When the ce of a typhoon goes over a mountain range, its circular flow and isobars are deformed by fric and influence of the mountain slopes, as the deformation advances. Occasionally, a l vortex breaks up into two or three vortices. In the first half of this report, the deforma in the central area of a typhoon is theoretically and qualitatively considered. By t qualitative considerations, the actual deformation which occurred at the Kyushu moun range is almost satisfactorily explained. In the latter half, the actual deformations statistically considered from the viewpoint of weather prediction. In the last part, the

ons which recently landed on Kyushu are examined individually. *Subject Headings:* Typhoon deformation 2. Topographic effects 3. Kyushu Island, Japan.—*From authors' ract.*

9.11–200 551.515.23:551.509.52

Tanaka, B.; Ichikawa, T.; Yasui, H. and Furuichi, M., **On the movement of typhoon na (No. 5414) and others in September 1954.** *Journal of Meteorological Research*, Tokyo, .):263–276, June 1956. 22 figs., 4 refs. In Japanese; English summary p. 263. **DWB, C**—In the present paper the typhoons June, Lorna and Marie, which attacked Japan in t. 1954, are investigated from the standpoint of forecasting. The results are as follows: In general the iso-thickness line of 19,000 ft on a 1000–500 mb thickness chart is the bound- between a zone to the south of the line where horizontal temperature gradient is small l another zone to the north of the line where temperature gradient is considerable. When a hoon approaches the 19,000 ft line, it tends to take the characters of an extra-tropical lone and to recurve. Height changes in the westerly zone on 500 mb level can be predicted ly well by extrapolation of rising area and falling area from the west on the 24-hr 500 mb ght change chart. Therefore, the 24-hr 500 mb height change chart can be used as an for forecasting of the typhoon, especially of its recurvature. (2) As the typhoon moves ally along the boundary circulation of the Pacific anticyclone, prediction of the variations the boundary shape of Pacific High becomes an important problem for typhoon forecast. The trough which makes a typhoon recurve is usually accompanied by cold air outbreaks large scale, changing the circulation pattern in the Far East. (4) The movement of the s of maximum pressure fall at surface is useful for typhoon forecast. *Subject Headings:* Typhoon movement 2. Typhoon forecasting 3. Recurvature of typhoons 4. Typhoon orna" (1954) 5. Japan.—*From authors' abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Albedo of clouds** (Peugh, Melnick), 9.11–26; **Actinometric data & networks, Japan,** 9.11–31; **Radiation data, Uzbekistan** (Iaroslavtsev), 9.11–113; **Beta ray ionization** (Miranda), 9.11–130; **Infrared spectrum, Mars** (Shaw et al.), 9.11–146; **Stratification effects on thermal radiation** (Kondrat'ev, Iastrebova), 9.11–158.

9.11–201 551.521.11:551.576.2

Elnesr, M. K. and Firesa, A. M., **Contribution à l'étude de l'énergie solaire en Egypte, 2, nébulosité et la durée d'insolation.** [Contribution to the study of the solar-energy in ypt, Pt. 2, Cloudiness and sunshine duration.] *Journal Scientifique de la Météorologie*, ris, 9(34):85–92, April/June 1957. 2 figs., 6 tables, 6 refs. **DWB**—In Pt. 2, authors took to account the cloudiness which allows the evaluation of the effective quantity of energy ring a given period. The study of cloudiness is made separately for each month of the year, the different zones of Egypt. In the same manner, the authors study the sunshine duration d its distribution according to time at Helwân. This led them, taking into account the diation of sun intensity by clear weather, to evaluations of the global energy daily received an horizontal plane, at various latitudes in Egypt, for different amounts of cloudiness. or Pt. 1, *see* 9.10–188, Oct. 1958, *MAB.*) *Subject Headings:* **1. Solar energy 2. Sunshine ration 3. Cloudiness 4. Egypt.**—*A.V.*

9.11–202 551.521.3:523.77

Thomas, Richard N., **Features of the solar spectrum as imposed by the physics of the sun.** *ientific Monthly*, Wash., D. C., 83(3):135–144, Sept. 1956. 4 figs. (incl. photos), 16 refs., eqs. **DWB, DLC**—The author discusses the solar constant value and its variations, the estion whether the variability of the solar constant is a true variability or whether it is used by some periodicity in the terrestrial atmosphere, the relationship between the solar ectrum and the relevant layers of the sun, thermodynamics, consideration of the region of ergy generation and of the distribution of energy in the continuous spectrum, and conditions

in the outer solar atmosphere including the photon and corpuscular components. *Su*
Headings: **1. Solar constant 2. Solar spectrum energy distribution.**—*I.L.D.*

9.11–203 551.521.326:551.507.3

Heppner, J. P. and Meredith, L. H. (*both, U. S. Naval Res. Lab., Wash., D. C.*), **Night**
emission altitudes from rocket measurements. *Journal of Geophysical Research,* Wash., D.
63(1):51–65, March 1958. 8 figs., table, 25 refs. **DLC**—Four rocket-borne photom
measured nightglow emissions near λ6300, λ5893, λ5577, and λ5335. The emitting re
of the oxygen green line, λ5577, was entirely between 90 and 118 km, and had a very s
lower boundary. The sodium D lines were encountered primarily between 85 and 110
with a maximum intensity at 93 km. The upper boundary of D line emission was not defi
due to tailing off of the distribution and low total intensity, but D line emission exten
into the 130- to 150-km region is indicated. The λ6300 photometer showed two dist
features: an emitting region from 56 to 100 km, and a large signal still present at the pea
flight, 163 km. We attribute the 56- to 100-km emission to the (9-3)Meinel OH band,
conclude that the region of oxygen red line emission must lie above 163 km. On the bas
relative band intensities for the Meinel OH bands and the dissimilarity of the signal-vs-alti
curves for the λ5335 and λ6300 photometers, we conclude that practically all atmosph
emission near λ5335 is due to an atmospheric "continuum," has a maximum intensity betw
100 and 110 km, and is at least as bright as the stellar background. During descent of
rocket through the E region, the photometers recorded a bright glow in the rocket's w
Energy for creating the glow had to come from atmospheric gases and not the rocket.
spectra and other features are discussed. *Subject Headings:* **1. Night airglow emis**
2. Rocket-borne photometers 3. Night airglow spectra.—*Authors' abstract.*

9.11–204 551.506.5:551.521

Huruhata, Masaaki and Nakamura, Junji (*both, Tokyo Astron. Obs.*), **Airglow observat**
on board the "Soya," Japanese expedition to Antarctic. *Japan. Science Council. Ionosp*
Research Committee, Report of Ionosphere Research in Japan, 11(2):35–40, June 1957. 3 fi
table, 2 refs. **DWB.** Also in: *Annales de Géophysique,* 14(2):175–178, April/June, 1
2 figs., 2 refs. French and English summaries p. 175. **DLC**—On board the "Soya," expedi
ship to the Antarctic, airglow observations were made from Nov. 1956 to April, 1957, du
her voyages from Tokyo to Cape Town and return. The zenith intensities of Å5577 line w
compared with the fluorescent surface of radium paint and were calibrated with the photom
of the Tokyo Astronomical Observatory. The results show that the latitude dependenc
intensity seems to be real, having the minimum intensity around the equator. The tende
at the middle latitude is still ambiguous. *Subject Headings:* **1. Airglow observations 2. "So**
Expedition 1956–57 3. Antarctica.—*Authors' abstract.*

9.11–205 551.521.

Manring, Edward R. and Pettit, H. B., (*both, G.R.D., AFCRC, Bedford, Mass.*),
5577 A emission of [OI] in the night airglow from Sacramento Peak, New Mexico. *Jour*
of Geophysical Research, Wash., D. C., 63(1):39–49, March 1958. 9 figs., 5 refs., 3 eqs. D
—From a photometric study of the 5577 A airglow, made during 125 nights, extending ove
two-year period, from Sacramento Peak, N. Mex., the following conclusions can be draw
(1) The regular features form a diurnal and seasonal repetitive pattern, for which the intens
during the equinoxes is brighter than during the solstices. A diurnal and seasonal variat
in the direction and amplitude of the maximum intensity is observed. This suggests a mo
which supposes that an intensity pattern exists on the dark side of the earth. The diu
variation at an observing station would be due to the earth's rotation and the seasonal variat
due to the change in position of the ecliptic plane with respect to the observing station. (2) T
two most important sporadic features observed were arc-like structures, which appea
during six nights, and portions of auroral activity, observed during four nights. (3) From
68 nights suitable for van Rhijn height determinations, a ratio of $I(75)/I(0) = 2.555$, correspo
ing to a height of 85 ± 68 km was determined. (4) A triangulation attempt was made betw
Sacramento Peak and Capillo Peak, with a height between 80 and 100 km indicated. *Subj*
Headings: **1. Night airglow emission 2. Sacramento Peak, N. Mex.**—*Authors' abstract.*

TEMPERATURE

See also: **Heating degree day data, U. S.,** 9.11–34; **Air temp., Bratislava** (Konček), 9.11–22; **Orographic waves & föhn** (Kuettner), 9.11–86; **Stratospheric temp., N. Hemisphere** (Tolefson), 9.11–87; **Frost effects on potatoes, Calif.** (Wilkins), 9.11–92; **Wind deviation from the isobar** (Weiller), 9.11–215; **Terdiurnal temp. and pressure variations** (Siebert), 9.11–216; **Föhn effect on thermal regime, Angrena Valley** (Morozova), 9.11–218; **Desiccation effects on temp. near the ground** (Deriąbin), 9.11–229.

9.11–206 551.524:551.510.42:551.586

Buffault, L., **Influence d'un relèvement de la température sur le fonctionnement des ers dits "à feu continu".** [Influence of a rise in temperature on the functioning of con- uously burning heating units.] *La Météorologie*, Paris, Ser. 4, No. 47:441–443, July/Sept. 57. 2 figs., 2 refs. French, English and Spanish summaries p. 441. **DWB**—The possible ationship of a meteorological element to a rise in frequency of cases of carbon monoxide soning is considered. The effect of air temperature on the functioning of the chimney is tussed and it is pointed out that since a draft occurs when the outside air temperature is ow that in the chimney, the sudden rise of external temperature and sudden decrease in density of the outside air may reverse the draft so that the gases in the stove such as carbon onoxide, hydrogen sulfide, etc. are not removed. As a result of these considerations the thor compares a certain mean air temperature relative to an interval of elapsed time, a nperature representative of the interior of the chimney *Dt* later with the minimum night nperature representative of the outside air during the critical hours. Graphs illustrating s procedure for forecasting approximately the danger from carbon monoxide poisoning on basis of forecast night minimum temperatures are presented. *Subject Headings:* **1. Carbon onoxide poisoning 2. Temperature effects on chimney gas 3. Indoor air pollution.**—*I.L.D.*

9.11–207 551.524.36:551.501.6

Lackey, Earl E. (*Environmental Analysis Branch*), **A graphic method for assessing urly temperature probabilities.** *U. S. Quartermaster Research and Development Center. vironmental Protection Research Div., Technical Report*, EP-46, March 1957. 18 p. 6 figs., tables, 3 refs., eq. **DWB** (M86 U585t)—A method is presented for estimating hourly tem- rature distribution in Jan. in a high latitude continental area such as Alaska, from a knowl- ge of the extreme minimum, extreme maximum, the mean (hourly, daily or monthly) and e length of record. An adjusted hourly probability scale is constructed for the Alaskan terior by using the averaged hourly temperatures of eight stations. An examination of the tual Jan. frequencies of hourly temperature at Delta Sur and adjusted probability scale dicates that the actual frequencies depart from the straight probability lines by not more an 3°F and 4°F. The adjusted probability scale can be used for stations outside the area. discussion of characteristics of extreme values is presented in the appendix. *Subject Head- gs:* **1. Temperature probabilities 2. Graphical presentation 3. Temperature probability ale 4. Alaska.**—*I.L.D.*

9.11–208 551.524.36(73)

*Seamon, L. H. and Bartlett, G. S. (*both, U. S. W. B., Wash., D. C.*), **Temperature extremes United States.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 43(5):7–8, Jan. , 1956. **DWB**—Tables show highest and lowest temperatures in the U. S. by months ncluding year, day and place), and the record highest and lowest temperature for each state the U. S. up to 1953–54. Highest was 134°, July 10, 1913 at Greenland Ranch, Calif. west −70°F at Rogers Pass, Mont., on Jan. 20, 1954. Montana has a 187°F range (+117° −70°F), N. Dakota 181°F, Calif. 179° and S. Dakota, Colorado, and Idaho 178°F and yoming 177°F (for entire state over the entire period of record). Texas has only a 143° nge! *Subject Headings:* **1. Temperature extremes in U. S. 2. United States.**—*M.R.*

9.11–209 551.524.4:535.4

Hamilton, R. A., **Determination of temperature gradients over the Greenland Ice Sheet optical methods.** *Royal Society of Edinburgh, Proceedings, Sec. A, Mathematical and ysical Sciences*, 64(4):381–397, 1956/1957. 6 tables, 4 refs. **DWB, DLC**—The temperature

gradient in the lower atmosphere can be directly determined by measuring the optical fractive index of the air. This method is suitable for use on the Greenland ice sheet w errors introduced by water vapor are small, and where the strong solar radiation reflec by the snow surface makes it difficult to measure temperature differences over height dif ences of about 1 meter. The refraction was measured by observing the apparent ver angle of each of a set of targets at distances up to 4 km from a theodolite. The refraction found to vary linearly with the distance of the target. The true vertical angle to the tar was determined when a second theodolite was available and reciprocal sights could be ta with it from the site of target to the fixed theodolite. The true vertical angle varied with t due to slow ascent of the theodolite as the firn slumped; a correction for this was made. standard error of the temperature gradient measurements was about 1.5×10^{-2} C°/m. considered that the method could be developed and improved so that over a range of 100 m temperature gradients could be measured to an accuracy of about 0.1°C/m. *Sub Headings:* **1. Temperature gradient 2. Refractive index 3. Greenland.**—*Author's abstrac*

9.11–210 551.524.4:551.51

Jenne, D. E. (*General Electric Co., Richland, Wash.*), **Vertical temperature profiles relation to other meteorological elements and to air pollution.** *Air Pollution Control Asso tion, Pittsburgh, Journal,* 7(1):31–35, May **1957.** 10 figs., 9 foot-refs. **DWB, DLC**—T perature profiles in the first 400 ft above ground surface near Hanford, Wash. are conside with respect to fog, sky condition, wind, and warm and cold air advection. The significa of each situation is discussed in regard to the accumulation and dispersal of air pollution. case of inversion breakdown due to fog formation is considered and this type of situatio shown to be extremely adverse to effective diffusion of air contaminants. It is shown th during lapse periods in summer, there is a tendency toward steeper lapse rates as the wind sp increases. The character, as well as the speed of the wind, is shown to be an important fa in consideration of nighttime temperature profiles. The features of cold and warm air adv tion are presented and their effectiveness in dispersal of air pollution is considered. *Sub Headings:* **1. Temperature profiles 2. Lapse rates 3. Atmospheric pollution dispe 4. Hanford, Wash.**—*Author's abstract.*

9.11–211 551.524.4:551.578

Johnson, Oliver, **Low level inversions over a snow surface.** *Canada. Suffield Exp mental Station, Ralston, Alberta, Suffield Technical Paper,* No. 103, Aug. 30, **1956.** 4 p. tables, 4 refs. **DWB** (M055 C212s)—During the winter of 1945–46 a large number of vert temperature profile measurements, extending up to 1000 ft above terrain, were made a the Suffield Experimental Station. These temperature profiles have been analyzed in or to determine the frequency of occurrence of low level inversions and the conditions under wh they occur. The main object of the analysis was to determine if the results could be used a basis for forecasting these inversions. The results of this analysis show that, over a sn surface, inversions persisted during the day on 45 out of 85 days of observations, and tha should be possible to forecast their occurrence with some degree of confidence. *Subject He ings:* **1. Low level inversions 2. Temperature profiles 3. Inversions over snow surfa 4. Ralston, Alberta.**—*Author's abstract.*

SOIL TEMPERATURE

See also: **Desiccation effects on soil temp.** (Deriabin), **9.11–229.**

9.11–212 551.525:551.579.5:631

Volobuev, V. R. (*Baku*), **Klimaticheskie usloviia i pochvy.** [Climatic conditions a soils.] *Pochvovedenie,* Moscow, No. 4:24–37, April **1956.** 10 figs. (incl. maps, graphs), refs. German summary in special resume section, p. 3. **DLC**—The method of soil-clima area is applied by using the following hydrothermal coordinates: annual precipitation (and mean annual temperature (t) and annual precipitation and radiation balance of the eart surface. The hydrothermal field of the diagram is divided into seven thermal and sev hygric series. The hydrotherms show the following relationship: $t=432 \log P-H_f$ and 0 $\log R=P-H_r$ where H_f and H_r are constant for every hydrotherm and are indices of t

isture condition of a soil formation. By means of the hydrothermal system fourteen soil ups are established, namely tundra, forest-tundra, podzol, chernozem, chestnut soils, ozem, light soils, desert soils, light red soils, dry savannah, red-brown soils, red soils, yellow ls and cinnamon soils; their world wide distribution is shown on map. *Subject Headings:* **Soil types 2. Soil temperatures 3. Soil moisture.**—*I.L.D.*

WATER TEMPERATURE

9.11–213 551.526

Nan'niti, Tosio and Yasui, Masasi, **Fluctuations of water temperature off Turumi, Yokohama.** *Tokyo, Japan. Meteorological Research Institute. Oceanographical Lab., Collected reprints*, Vol. 4, No. 60, May **1957.** Reprint p. 5–6. 2 figs., 4 refs., eqs. In Japanese; English summary p. 5. **DWB**—Fluctuations of water temperature observed at a station off Turumi, Yokohama, were analyzed. As shown in Fig. 1, the long-period oscillations seem to ve been caused by the tidal current, $T=12$ h 25 m, and a local internal wave, $T=4$ h 20 m. rthermore there was another kind of fluctuation caused by a turbulon whose passage time 110 min as shown in Fig. 2. It will support the theoretical result such as $R(t)=1-(t/T_2)^{4/3}$ tained by E. Inoue. The internal waves with shorter period, $T=2$ min, theoretically pected were not observed as the measurement was made at an interval of 10 min. *Subject eadings:* **1. Water temperature variations 2. Turumi, Yokohama.**—*Authors' abstract.*

PRESSURE AND WIND

PRESSURE

See also: **Mt. waves** (Alaka), 9.11–14; **Antarctic Ocean pressure data** (Hofmeyr), 9.11–49; **Orographic waves & föhn** (Kuettner), 9.11–86.

9.11–214 551.541:551.543:550.342

§Vercelli, Francesco, **Relazioni fra microsismi, onde microbariche e mareografiche.** [Relation between microseisms, microbaric and tidal waves.] *Pontifica Accademia delle Scienze, Rome, Scripta Varia*, No. 12, 1952, p. 339–343. 4 figs., 2 refs. *Also:* Vercelli, Francesco and Morelli, Carlo, **Onde microsismiche e loro cause.** [Microseismic waves and their cause.] *Ibid.*, p. 345–350. fig., 12 refs. Both reprints from its **La Semaine d'Etude sur le Problème des Microséismes,** pub. **1952. DLC** (QE539.P6, No. 12)—In the first paper examples are given to show the types of microwaves caused by wind, by storms and by distant depressions. A synoptic chart showing a cold frontal system passing over the Gulf of Trieste corresponds with the microbarograph trace on which are indicated the various types of micro-oscillations. A macrograph is also shown and its interpretation indicated. Seismograms for May 2, 1947 are also presented (in second paper) to show the types of microseisms accompanying such disturbances. *Subject Headings:* **1. Microbaric waves 2. Microseismic waves 3. Macrograph oscillations 4. Gulf of Trieste.**—*M.R.*

9.11–215 551.542:551.552:551.524.7

Weiller, A. R., **Déviation du vent sur l'isobare.** [Wind deviation from the isobar.] *Journal Scientifique de la Météorologie*, Paris, 9(35):123–126, July/Sept. **1957.** 1 ref. **DWB**—Comparison of 2 series of measurements of the deviation of wind from the isobar with a few comments on the directional, hourly and seasonal influences. The second series of measurements confirms the importance of the variation of this angle function of the direction of the wind and the season. Directional and seasonal changes can be considered as a function of the average vertical thermal gradient, the wind deviation from the isobar varying inversely with the thermal gradient. Angle of wind with the isobar decreases when the turbulent viscosity increases. N.ly-winds form usually, on the average, an angle with the isobar three times greater than the W.ly-winds. On the coldest days of the year, the angle of wind with the isobar is almost double that in July. The gradient for the first 500 m is stronger in summer than in winter, and W.ly-winds are, according to statistics, the most unstable. *Subject Headings:* **1. Ageostrophic winds 2. Thermal gradient 3. Magny-les-Hameaux, France.**—*A.V.*

9.11–216 551.543.3 551.524

Siebert, Manfred, **A planetary representation of the terdiurnal variations of atmospheric pressure and temperature.** New York Univ. Dept. of Meteorology and Oceanography Contract AF 19(604)-1738, Scientific Report No. 4, July **1957.** 37 p. 6 figs., 8 tables, 41 refs. 26 eqs. **DWB** (M055 N532SR)—Terdiurnal planetary waves of pressure and temperature are derived from the third harmonic coefficients of pressure and temperature for about stations in both cases. The data for Jan. and July only are used for a representation of annual mean and the separated pure annual change. The resulting planetary waves represented by series of spherical harmonics. The influence of land-water distribution been considered for the temperature waves. The main terms of the pressure and the temperature waves belong to the annual change and are given by $P_4^3(\theta)$ terms. No possibility could be found to explain these terdiurnal waves (and three added important semidiurnal wave types by means of the resonance theory of atmospheric tides. *Subject Headings:* **1. Pressure waves 2. Temperature waves.**—*Author's abstract.*

WIND AND TURBULENCE

See also: **Gustiness analysis** (Johnson), 9.11–114; **Convection-diffusion processes** (Smith), 9.11–154; **Airplane observation of vertical pulsation** (Vorontsov), 9.11–226.

9.11–217 551.551.5:551.510.535:551.590

Booker, Henry G. (*School of Elec. Engrn., Cornell Univ., Ithaca, N. Y.*), **Concerning ionospheric turbulence at the meteoric level.** *Journal of Geophysical Research,* Wash., D. C. 63(1):97–107, March **1958.** 3 figs., 13 refs. **DLC**—Booker (*Ibid.,* 1956) and Booker and Cohen (1956) have given reasons for thinking that application of fluid mechanics to meteor phenomena leads to results in discord with previous thought. This has led to a discussion (Manning and Eshleman, 1956) that is continued in this paper. An underlying feature of the discussion is a phenomenon that may be described as the rough trail paradox. This arises from the fact that the turbulence velocity of the large eddies is about ten times greater than the turbulence velocity of the small eddies. For a trail that has been rendered rough by the small eddies, let us examine the echoes from two points, separated by a distance of the order of the large eddy size. Due to the motion of the large eddies, interference between the two points is taking place at a rate ten times faster than the rate at which the phase of the echo from either point is taking up random values due to the motion of the small eddies. The upshot is that, as already mentioned by Booker, the most obvious features of the fading of long-duration meteor echoes are controlled by the motion of the large eddies even when the mechanism of return is backscattering associated with the small eddies. Failure to appreciate this point seems to have led Manning and Eshleman to claim as an antithesis to the Kolmogoroff-Heisenberg theory of turbulence results that, in fact, are consistent with it. *Subject Headings:* **1. Turbulence in the ionosphere 2. Rough trail paradox 3. Eddy motion 4. Meteor echoes.**—*Author's abstract.*

WIND DISTRIBUTION

See: **Wind deviation from the isobar** (Weiller), 9.11–215.

WIND VARIATIONS AND SPECIAL WINDS

See also: **Orographic waves & föhn** (Kuettner), 9.11–86; **Vertical wind shear intensities** (Tolefson), 9.11–88; **Trade wind kinetic energy release** (Palmén), 9.11–189.

9.11–218 551.553:551.524.4:551.588

Morozova, M. I., **Rol' fenovogo effekta gorno-dolinnoĭ tsirkuliatsii v formirovanii temperaturnogo rezhima Angrenskoĭ doliny.** [The role of the föhn effect of the mountain-valley circulation in the formation of the thermal regime of the Angrena Valley.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Meteorologiia i gidrologiia Uzbekistane.** Tashkent, **1955.** p. 43–49. 3 figs., 4 tables, ref.) **DLC**—The mountain valley circulation is characteristic of the Angrena Valley during the entire year, but during

winter months it produces a strong inversion. During the winter months the frequency northwesterly mountain winds is 63% (35–40% in summer) and that of the southwesterly ley wind is 20% (35–40% in summer). The mountain wind appears as a warm wind for tions in middle parts of the valley. During the first moments of origin of the mountain id, when only air cooled on snow-covered peaks is involved, the temperature in the upper t of the valley falls since adiabatic heating is still small and does not compensate for the in temperature as the result of advection of colder air. In subsequent moments adiabatlly heated air from the free atmosphere is involved so that the temperature in the upper ley rises. In the middle and lower parts, the temperature drops and is most noticeable ing winter when the duration of the mountain wind is longest. Also, the effect of the untain wind regimes upon atmospheric humidity is described. Data and maps on mean nthly frequency of wind direction at Ablyk, isolines of mean monthly Jan. temperature, quency of wind duration at 0100, 0700 and 1300 h at Ablyk, mean monthly air temperature ing Jan., Feb., Nov., and Dec. for various stations and isolines of relative humidity for n. and July are presented. *Subject Headings:* **1. Mountain-valley wind patterns 2. Mountain-valley circulation 3. Inversions in winter 4. Angren Valley, Uzbekistan.**—*I.L.D.*

9.11–219 551.553.21(521)

Sawa, S. and Arakawa, H., **Operations research of NW or winter monsoon over Tsugaru-Strait.** *Journal of Meteorological Research*, Tokyo, 10(1):1–22, **1958.** 7 figs., 13 tables, 6 refs. Japanese; English summary p. 1. **DWB, DLC**—Characteristics of N.W. monsoon over Tsugaru Strait are studied along the following line: Hourly wind data over 1952/57 observed Shiriya Harbour are analyzed as shown in Figs. 1a–1t (20 figs.). Dangerous winds with high seas are concluded to be gales over 10 m/sec from North to West. Statistically, about outbreaks (over 10 m/sec), with some thirty hours-duration, will be experienced during the winter season (Nov.-Feb.). For an experiment with a model ship, about 30% of voyage was blocked or hindered by these winter monsoons. Behaviors may vary year by year, although statistical frequency curves on gales or light winds show pronounced regular patterns. *Subject Headings:* **1. Monsoon winds 2. Winter monsoons 3. Tsugaru-Strait, Japan.**—*Authors' abstract.*

WIND EFFECTS

See also: **Equatorial ocean surface** (Hidaka), 9.11–73; **Wind effects on salinity distrib. in rivers** (Barlow), 9.11–77.

9.11–220 551.556.2:551.508.5

van Eimern, Josef, **Über die Veränderlichkeit der Windschutzwirkung einer Doppelumreihe bei verschiedenen meteorologischen Bedingungen.** [Variability of wind shelter effect of a double tree row during different meteorological conditions.] *Germany. Deutscher Wetterdienst, Berichte*, 5(32), **1957.** 21 p. 19 figs., 12 tables, 13 refs. **DWB, DLC**—Analysis of wind measurements carried out east of a 12 m high double tree row of windbreak Hamburg-Wulfsdorf during the summer of 1955 and winter 1955-56. Wind measurements were made at 3 m with recording anemometers and at 1.5 m with manual wind recorders. The experimental procedure and instrumentation are described with the aid of diagrams and photographs. The numerical results are presented in graphs and tables. They include wind velocities at 1.50 m, the dependence of the shelter effect upon the unobstructed wind velocity, and shelter effect at different wind directions, when trees are covered with leaves and when they are bare, the dependence of the wind velocity at 3 m upon wind direction, both when trees are in leaf and bare, the dependence of shelter effect upon unobstructed wind velocity and time of day; and the influence of the duration of measurements upon the mean value; frequencies of wind intensities, etc. *Subject Headings:* **1. Shelter belt effects 2. Wind measurements 3. Wind instruments 4. Hamburg-Wulfsdorf, Germany.**—*I.L.D.*

9.11–221 551.556.3:621.311.24

†Vinter, A. V. and Tikhomirov, N. M., **Energiia vetra kak moshchnyĭ faktor khoziaĭstvennogo osvoeniia pustyn'.** [Wind energy as a basic factor in the economic utilization of deserts.] (In: Akademiia Nauk SSSR. Botanicheskiĭ Institut, **Pustyni SSSR i ikh osvoenie,**

Vol. 2. Moscow, Akademiia Nauk SSSR, **1954.** p. 520–565. 24 figs. (incl. photos), 4 tab 46 refs.) **DLC**—A most comprehensive survey on the progress made in the Soviet Un in the utilization of wind energy in the deserts and semideserts of the Soviet Union. Deta descriptions with the aid of diagrams and photographs are given of various types of w generators and wind power installations used in various parts of the U.S.S.R. Data given on the hourly productivity of a wind generator in lifting water to various levels a function of wind velocity and the annual productivity of wind generators in lifting wa as a function of mean annual wind velocities, and graphs showing the results of experime with and without the use of inertial accumulation up to the beginning of actions of the regula tables giving the fundamental indices of the most important Soviet wind generators and variations of their power as a function of varying wind velocity, etc. The efficiency a economics of wind generators are considered. *Subject Headings:* **1. Wind energy utilizat 2. Wind generators 3. U.S.S.R.**—*I.L.D.*

UPPER AIR WINDS

See: **Upper air winds data, S. Atlantic** (Kuhlbrodt), 9.11–23; **Upper air wind forecasting** (Garriock), 9.11–143; **Air trajectory tracing** (Miyake), 9.11–173; **Jet stream analysis** (Lamb, Robinson), 9.11–187; **Jet stream nomograms** (Morley), 9.11–188; **Jet stream structure** (U. S. Bureau of Aeronautics), 9.11–190; **Vertical velocity in jet stream** (Vuorela), 9.11–222.

VERTICAL MOTION

See also: **Mountain waves** (Alaka), 9.11–14; **Mountain wave zones & pilot reports, U. S.** (Harrison), 9.11–20.

9.11–222 551.558:551.513.2:551.55

Vuorela, Lauri A., **A study of vertical velocity distribution in some jet stream cases o Western Europe.** *Geophysica*, Helsinki, 6(2):68–90, **1957. DLC.** Also issued as: *Helsin Universitet. Meteorologiska Institutet, Mitteilungen*, No. 80, **1957.** 9 figs., table, 15 refs., 4 e **DWB, DLC**—Some vertical cross sections (Jan. 15–17, 1951 and Nov. 7, 1952) illustrating distribution of vertical velocities associated with certain well defined jet streams over Weste Europe are presented. The calculations strongly support the view, presented by the autl earlier, that the tropopause height is closely connected with the sign of vertical velocity in adjacent regions. In addition, an attempt at partial use of moist-adiabatic lapse rates wh computing vertical velocities by the aid of a method, commonly referred to as the adiaba method, has been performed. *Subject Headings:* **1. Vertical velocities 2. Jet stream 3. We ern Europe.**—*Author's abstract.*

9.11–223 551.558.1:551.52

Vorontsov, P. A., **O konvektivnykh dvizheniiakh v prizemnom sloe atmosfery.** [Co vective movements in the air layer near the ground.] *Leningrad. Glavnaia Geofizicheska Observatoriia, Trudy*, No. 54(116):3–23, **1955.** 14 figs., 7 tables, 6 refs. **DLC**—An extens study on the quantitative characteristics of vertical air movements in the layer of the mosphere near the ground based upon observations on the movement of balanced pibals, data from a meteorograph and wind recorders on a captive balloon. The analysis is concern with the formation of thermal currents at the surface of the earth; the relationship betwe vertical velocity (W) and current velocity (V), pulsation of atmospheric temperature; co tions for the movement of thermals in the lower atmospheric layer and the distribution velocity at different parts of the path of an eddy; the dependence of vertical velocity (upon the vertical temperature gradient (γ) and the vertical gradient of wind velocity (dU/dZ frequency of levels of termination of the current on eddy ascent; mean time of passage convective currents; variation of vertical temperature gradient (γ) and moisture content during convection; and mean characteristics of vertical currents over different surfaces duri convection. Extensive numerical data are presented in tables and graphs. *Subject Headin* **1. Convective currents 2. Thermal currents 3. Vertical temperature gradient 4. Verti wind velocities.**—*I.L.D.*

9.11–224 551.558.1

Vorontsov, P. A., **Ob urovne razvitiia konvektivnykh dvizheniĭ v atmosfere.** [Level of development of convective motion in the atmosphere.] *Meteorologiia i Gidrologiia*, No. 6, 26–29, Sept. **1956.** 2 tables, 5 refs., 2 eqs. **DWB, DLC.** Trans. into English available for reference U. S. Weather Bureau Library (M13.1 V954on) Typescript. 10 p. tables, etc.—Various characteristics of the thermal condition of the atmosphere during the formation of convective currents are discussed. With the aid of equations, the author examines the rise and acceleration of thermal currents over a heated earth, the rise of currents in a turbulent atmosphere and the distribution of thermal currents in layers. Data are presented on the average measurement of thermal currents from the earth's surface obtained from pilot balloon observations over different types of surfaces (semidesert, irrigated fields, water surface, etc.) and characteristics of structure of the inversion. *Subject Headings:* **1. Convective currents 2. Thermal convection currents.**—*I.L.D.*

9.11–225 551.558.1:551.576.11

Vul'fson, N. I., **Kompensatsionnye niskhodiashchie techeniia obuslovlennye razvivaiushchimisia kuchevymi oblakami.** [Downward compensation currents produced by developing cumulus clouds.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 1:94–103, **1957.** 6 figs., 2 tables, 9 refs. **DLC.** Trans. into English by J. Thompson in the Eng. language edition of the **Izvestiia,** *Bulletin of the Academy of Sciences of the U.S.S.R., Geophysics Series*, No. 1:104–119, **1957,** issued 1957 by American Geophysical Union. 3 figs., 5 tables, 9 refs. **DWB** —The results of measurement show that compensational downward currents differ sufficiently in temperature from their surroundings. They are observed immediately near developed clouds and always close to their upper parts. The vertical extension of descending currents does not exceed 700–800 mi. Along the entire thickness of a cloud they are observed only in cumulus clouds with little vertical development. The area of horizontal cross section of compensating current is on the average commensurate with the area of the cloud; in the case of highly developed cumulus clouds it is considerably smaller. The data agree with the results of studies in ascending currents in developing cumulus clouds. *Subject Headings:* **1. Vertical currents 2. Cumulus cloud formation.**—*Trans. from author's abstract* (*I.L.D.*).

9.11–226 551.558.29:551.551.5

Vorontsov, P. A., **Vertikal'nye pul'satsii v atmosfere po nabliudeniiam s samoleta.** [Vertical pulsations in the atmosphere according to airplane observations.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 54(116):44–58, **1955.** 11 figs., 6 tables, 7 refs., eqs. **DLC**—The author analyzes the characteristics of vertical pulsations of the atmosphere—W' over steppe, extensive forest areas, irrigated cotton oasis, semidesert and desert areas, even and broken country and over various points on the air route Leningrad-Gorki-Saratov, measured by means of accelograph mounted on an airplane. The contents of this study include the following: mean magnitude of vertical pulsations—W' over different types of land surface; maximum magnitudes of vertical pulsations; characteristics of the distribution of vertical pulsations during individual days during the transition from one underlying surface to another; the dependence of the magnitude of vertical pulsations; the condition of the atmosphere and calculation of the coefficient of turbulent exchange. Extensive data are presented in tables and graphs. *Subject Headings:* **1. Vertical pulsations 2. Airplane observation 3. Turbulent exchange coefficients 4. U.S.S.R.**—*I.L.D.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **City street-condition classification** (Fischer), **9.11–98.**

9.11–227 551.571:551.579.5:622.11:631.67

Tsuberbiller, E. A. and Krasnitskiĭ, G. A., **Vozdeĭstvie nizkoĭ vlazhnosti vozdukha na roizrastanie pshenitsy pri iskusstvennom oroshenii.** [Influence of low air humidity on the

development of wheat under artificial irrigation.] *Moscow. Tsentral'nyi Institut Progno Trudy*, 37(64):27–31, **1954.** 3 tables. **DLC**—The author presents the results of an exp mental study on the means of preventing damage to grain crops by low atmospheric mois content by maintaining a moisture supply in the soil corresponding to the magnitude of evap tion. Field experiments were carried out in connection with summer wheat plantings in I near Tashkent. Data are presented on the number of days with atmospheric moisture de during the vegetative period of flowering-waxy ripeness and milky-waxy ripeness and number of days with large moisture deficit (44–47 mb) during the period of formation. I shown that by maintaining sufficient moisture in the soil it is possible to counteract the injurious effect of an atmospheric deficit of 27–40 mb (also, individual days of 44–47 mb) u grain crop, not only of local wheat varieties but also of European wheat. *Subject Headi* **1. Low humidity effects on wheat 2. Atmospheric moisture deficit 3. Soil moisture 4. I gation 5. Tashkent, Uzbek S.S.R.**—*I.L.D.*

EVAPORATION AND EVAPOTRANSPIRATION

See also: **Antarctic precip. and evap. data** (Loewe), 9.11–50; **Evap. from forest floors** (Lowry), 9.11–111.

9.11–228 551.573:551

Cochrane, N. J., **Evaporation from lakes and reservoirs.** *Water Power*, London, p. 1 193, May **1956.** (Abstracted from reprint.) **DLC**—Proposed expression:

$$E_c = \frac{T^2}{100}\sqrt[3]{\frac{U+3'}{20\,H_r}}\left(\frac{60}{H_rT}\right)0.8$$

E_c—open water evaporation [inch]; T—temperature [F]; U—wind speed [MPH] 10 above water; H_r—relative humidity. All values are annual means or totals. Favora agreement with water budget data for a number of lakes was obtained. *Subject Headi* **1. Evaporation from lakes and reservoirs.**—*A.A.*

9.11–229 551.573:631.43:551.524.2:551.52

Deriabin, V. P., **O vliianii prosykhaniia pochvy na ee teplovoĭ rezhim.** [The influence soil desiccation on its thermal regime.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, N 9:1099–1106, **1956.** fig., 2 tables, 6 refs., 28 eqs. **DLC**—A theoretical analysis of the influe of desiccation of the soil upon the heat regime and upon that air layer immediately above t ground. It is shown that the heat regime of the soil depends primarily upon evaporati within the soil, in particular upon the thickness of desiccated soil layer. The calculatio presented indicate that in relation to the daily fluctuations of the soil surface temperatu the latter can be regarded as homogeneous in the case of a homogenous surface layer of 10 c thickness. The amplitudes of the temperature oscillations of the soil surface rapidly increa as the thickness of the desiccated layer increases. The size of the amplitudes in differe thickness of desiccated soil decreases with increasing depth below the soil surface. T diminution of amplitude with depth occurs actually in the desiccated layer. *Subject Heading* **1. Desiccation effects on soil heat 2. Desiccation effects on soil surface temperatures 3. De iccation effects on temperatures near the ground.**—*I.L.D.*

9.11–230 551.5

Molchanov, L. A., **Novaia karta ispariaemosti na territorii Sredneĭ Azii.** [New potenti evaporation map for Central Asia.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut Mat matiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 35–3 fig., 6 refs., eq.) **DLC**—The distinction between actual and potential evaporation is discusse and the formula for calculating potential evaporation developed by N. I. IVANOV and modifie by the author, namely:

$$E = 0.00144\,(25+T)^2(100-a)$$

ised to construct a map giving isolines of potential evaporation in Central Asia (E—monthly tential evaporation in mm, T—mean monthly air temperature, a—mean monthly relative midity). A map with isolines of annual potential evaporation in Central Asia is presented. ie author discusses the characteristics of evaporation as indicated by measurements made th a Wild evaporimeter at Tashkent and Turtkul; the range of annual potential evaporation various years, and the annual distribution of potential evaporation in Central Asia. *Subject adings:* **1. Potential evaporation 2. Central Asia.**—*I.L.D.*

9.11–231 551.573:581.11

Wilcox, J. C. (*Experimental Farm, Summerland, B. C.*), **Correlation of meteorological ta with consumptive use of water by plants.** *Canadian Society of Agronomy, 2nd Annual eeting, Univ. of Toronto, June* 25–28, 1956, *Proceedings*, Sec. C, p. 39–51. [Pub. **1956.**] igs., 2 tables, 16 refs.—Problems of evapotranspiration are discussed and two major methods determining consumptive use outlined: one, the meteorological method (PENMAN, THORNWAITE and others), and the other the use of soil moisture blocks, tensiometers or tanks. rious methods of soil moisture measurement, determination of drainage rate and effect irrigation, etc. are discussed and illustrated graphically. Rates of consumptive use are own in table based on two plots. *Subject Headings:* **1. Evapotranspiration estimates 2. Irrition effectiveness.**—*M.R.*

CONDENSATION

See also: **Aerosol mechanics and bibliogs.** (Fuks), 9.11–6; **Cloud Physics Conference, Tucson, April 1956,** 9.11–62; **Freezing nuclei counters** (Warner), 9.11–129; **Aerosol electrification** (Kulagin), 9.11–302.

9.11–232 551.574.1:551.578.41

Kumai, Motoi, **Electron-microscope study of snow crystal nuclei, Pt. 2.** *Geofisica Pura e pplicata*, Milan, 36:169–181, Jan./April **1957.** 16 figs., 4 tables, 13 refs. **DLC**—Experiental work was conducted during the winters of 1952–55 in an igloo, half way up Mt. Taisetsu 050 m), Mt. Tokachi (1030 m) and Mt. Okuteine (820 m) in Hokkaido. One solid nucleus enter nucleus) was observed almost always in the central portion of a snow crystal. From ieir electron micro-diffraction patterns, the materials of the nuclei were classified into three nds; a single crystal, polycrystalline or amorphous substances. The patterns of the single ystal gave a hexagonal cross grating, the atomic arrangement in their basal plane had some milarity to that of an ice crystal. Some polycrystalline center nuclei were small sea salt rticles. Their shape was similar to that of the nuclei of sea sprays, and their patterns incide with that of the sea salt. Some amorphous center nuclei were observed which looked e a liquid droplet under the operating condition of the electron-microscope. It seemed that ey are chemical components in the sea salt such as KCl or MgCl particles. In the other rts of snow crystal, many smaller nuclei (condensation nuclei) were observed. These clei are also aerosols in the atmosphere; their size was $0.1 \sim 0.01\mu$ in diameter. They gave e Debye-Scherrer ring; their patterns were different in each specimen. Their materials nsist of various substances. From these data, the origin of nuclei and the mode of action the center nucleus were discussed. (For Pt. 1, *see* 3.4–210, April 1952, *MAB.*) *Subject eadings:* **1. Electron microscope studies 2. Snow crystal nuclei 3. Nuclei structure.**—*uthor's abstract.*

9.11–233 551.574.1

Magono, Choji; Orikasa, Keitaro and Yamazaki, Tadashi, **On the behaviour of water oplets in the air at temperatures below freezing.** *Sapporo, Japan. Hokkaido Univ. Faculty Science, Journal*, Ser. 7, Geophysics, 1(1):1–5, Jan. **1957.** 3 figs., 26 photos., ref. Also in: *eather Radar Conference, 6th, Cambridge, Mass., March* 26–28, 1957, *Proceedings*, pub. **1957.** 15–19. 2 figs., 8 photos, ref. **DWB** (M01.81 R124pc)—When warm water droplets fall ddenly into a cold air region in a cold chamber, they exhibit various interesting behaviors, r example, tracks resulting from rapid evaporation and condensation, disruptions caused by dden freezing, and sharp winding of tracks in their courses of fall. These phenomena were

photographed and are shown in this paper. Such phenomena probably have connection w the condensation trails of airplanes. *Subject Headings:* **1. Cold chamber experiments 2. C trails.**—*Authors' abstract.*

9.11–234 551.574.1:551.578.41:548

Maruyama, H. (*Met. Res. Inst.*), **Electron-microscope study of the ice crystal nuc** *Papers in Meteorology and Geophysics*, Tokyo, 7(3):251–266, Oct. **1956.** 34 figs. (phot 12 refs. **DWB**—By employing several kinds of effective chemical substance, solu and insoluble, as ice crystal nuclei, the ice crystals were formed in a cold box wit which the temperature was comparatively high, i.e., above −20°C, and their plastic repli were observed through the optical- and the electron-microscope. The author could not the difference of crystal habits according to the various nucleus substances. Some dodecago crystals were found in the plates. As for the size of the nuclei, the smaller nuclei were s with the lower environment temperature. While the size of the AgI-nuclei which were effect above −15°C was larger than the order of 10^{-5} cm, that of most AgI-smoke particles belon to the order smaller than 10^{-6} cm. On the one hand, according to almost all the pictures of plastic replicas of the ice crystals which were formed with the smoke particle nuclei of solubility such as AgI, Ag_2S and PbI_2, their nuclei were seen near the center of the crys On the other, regarding the nucleus substance of high solubility such as $AgNO_3$, NaI and NH the existence of the nucleous particles was not recognized in the replicas of the crystals. *Sub Headings:* **1. Ice crystal nuclei 2. Electron microscope studies.**—*Author's abstract.*

9.11–235 551.574.1:551.578.41:536

Mason, B. J., **The physics of water and ice.** *Weather*, London, 13(2):63–65, Feb. 19 Also in: *Advances in Physics*, London, 7(26):i–ii, April **1958.** **DWB**—Account of papers a discussion at a seminar held by the Royal Society on Nov. 14, 1957 on experimental a theoretical aspects of water and ice in relation to their properties and structure. Seve reports on temperature vs structure of ice, dielectric constant of ice crystals, electric cond tivity of pure water and ice, and structure of liquid water were read by KATHLEEN LONSDA H. GRÄNICHER (Zurich), L. DE MAYER (Göttingen) and VAN PANTHALEON VAN ECK (Amst dam), respectively. Meteorological aspects were discussed in 2 papers by B. J. MAS J. HALLET and E. J. LANGHAM—on transitions of ice crystal habits, and on freezing of drop from 10μ to 1 cm in diameter. *Subject Headings:* **1. Physics of water 2. Ice physics 3. Fre ing nuclei.**—*M.R.*

9.11–236 551.574.1:551.578.

Nakaya, Ukichiro and Kumai, Motoi, **Electron-microscope study of center nuclei of sn crystals.** Sapporo, Japan. Hokkaido Univ. Faculty of Science, Contract AF 62(502)-12 Scientific Report, No. 2, Dec. **1956.** 5 p. 24 figs., 3 tables, 4 refs. **DWB**—Experimen work was carried out in an igloo, half way up Mt. Tokachi, 1030 m above sea level, in the cent part of Hokkaido. One solid nucleus, center nucleus, was observed at the center of sn crystals in 190 cases among 202 samples tested. Combining with the former results obtai by M. KUMAI, it was confirmed that almost all snow crystals have detectable nuclei at t center. Electron-microdiffraction patterns were taken with respect to some of the sampl From these patterns and the shape of the nuclei, the material of the nuclei was estimat Roughly speaking, soil particles occupy 60% of observed nuclei, sea salt particles 20%, co bustion product or carbon particles 10%, and 10% cannot be estimated. *Subject Headin* **1. Snow crystal nuclei 2. Nuclei shapes 3. Electron microscope studies 4. Mt. Tokac Japan.**—*Authors' abstract.*

9.11–237 551.574.1:551.508.

Pollak, L. W. and O'Connor, T. C. (*Dublin Inst. for Advanced Studies*), **Decay of aeros in small and very small vessels and a static method for determining the size of condensati nuclei.** *Geofisica Pura e Applicata*, Milan, 31:66–79, May/August **1955.** 3 figs., 2 tabl 14 refs., 14 eqs. German and English summaries, p. 66–68. **DWB, DLC**—The advanta of the new "static method" of determining nuclei size, density, mass, and character, over t so-called "dynamic" method of NOLAN and GUERRINI (*see* 6H–111, Aug. 1955, *MAB*) whi

ows only averages for periods of 10–30 min to be obtained are discussed. The static method ives from Hentschel's method (61–109) of sampling nuclei in a small container at 5 successive ervals to determine the decay rate of stored nuclei. This method has been modified by otographic recording (shortening time from 24 min to 8 min for 3 readings). The size can determined from only 2 readings, but 3 are required for a complete quantitative description the nuclei. Theory, disadvantages of static method, empirical testing of FÜRTH's theory are cussed. *Subject Headings:* **1. Nuclei sampling methods 2. Nuclei decay. I. Hentschel, G. Nolan, P. J. III. Fürth, R.**—*M.R.*

9.11–238 551.574.1:551.508.91

Pollak, L. W.; O'Connor, T. C. and Metnieks, A. L. (*all, Dublin Inst. for Adv. Studies*), **n the determination of the diffusion coefficient of condensation nuclei using the static and namic methods.** *Geofisica Pura e Applicata*, Milan, 34:177–195, **1956.** 5 figs., 7 tables, refs. English and German summaries, p. 177–178. Appendix: Fürth, R., **Comments on atic diffusion measurements in nucleus counters,** p. 192–195. **DLC**—The authors discuss e development of photoelectric nuclei counters with air columns smaller than 3.85 cm for e in the static method and the theory and application of the static method. The dynamic ethod is described and the effect of varying the air flow on the results obtained with the ffusion box and the influence of humidity on the diffusion coefficient determined with the ffusion box were investigated. The comparison of the diffusion coefficients obtained y these methods shows that the diffusion coefficient of large hot nichrome wire nuclei $D \leqq 10.10^{-6}$ cm²/sec) determined by the static method is approximately one-third of that obained with the dynamic method. An air flow of one liter per minute is used. The diffusion efficients measured by the two methods approach each other with decreasing size of nuclei. *ubject Headings:* **1. Photoelectric nuclei counters 2. Nuclei diffusion coefficient.**—*I.L.D.*

9.11–239 551.574.1

†Wieland, Walter (*Locarno-Monti*), **Die Wasserdampfkondensation an natürlichem erosol bei geringen Übersättigungen.** [Condensation of water vapor on natural aerosol t small supersaturation.] *Zeitschrift für Angewandte Mathematik und Physik*, Basel, 7(7):428–59, **1956.** 13 figs., 7 tables, 24 refs., 7 eqs. **DLC**—Theoretical and experimental background on the condensation of water vapor around nuclei is summarized and the results of the uthor's own experiments are communicated. Newly developed equipment is described. eries of measurements give the accumulated concentration of nuclei depending on supersaturation for different weather situations in North Italy. "Activity spectra" are derived howing the intensity of nucleation for undisturbed and mixed air masses. The effect of emperature inversions, adiabatic movements and mixing processes is discussed. *Subject Headings:* **1. Condensation nuclei 2. Locarno-Monti, Italy.**—*A.A.*

9.11–240 551.574.41(569.4)

*Duvdevani, S. (*Dew Research Station, Karkur, Israel*), **Dew gradients in relation to limate, soil and topography.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** p. 136–152, pub. **1953.** 7 figs., 10 tables, 5 refs. Discussion, . 148–152.) **DWB**—The author presents extensive statistical data on the incidence and istribution of dew in Israel based upon the Duvdevani optical method of dew measurement. Numerical and graphical data are given on the total amount of dew and number of nights ith dew, for various localities. Total four year averages of monthly amounts of dew and umber of dew nights, monthly dew amounts in relation to altitude, monthly totals of dew t Tel Shalom, and number of nights with dew at Tel Shalom, and profiles at Tel Shalom, onthly totals of dew and number of nights with dew at Gevulot, variable thickness of wetted il crust in relation to amount of dew per night, etc. are presented. Dew profiles, bottom dew, nd subterranean vapor movement and its measurement are discussed. *Subject Headings:* **Dew distribution 2. Dew data 3. Israel.**—*I.L.D.*

9.11–241 551.574.42

*Learnard, Richard B., **A summary of the icing conditions found on Mount Washington, . H., during the years from 1943 to 1952.** *Mount Washington Observatory, Gorham, New*

Hampshire, Scientific Report, No. 4, Oct. 28, **1953.** 10 p. almost entirely tables. **DW** A number of statistical analyses are made of the 3500 routine icing observations made on Washington from Oct. 1943 to May 1952. The number of cases of rime, glaze, trace, li moderate and heavy icing for each year of record. Records include tables showing freque of ice with respect to liquid water content and temperature (intervals 0–7, −8 to −12, − to −18 and > −29°C) worked out by total cases, percent of temperature observations percent of water content observations respectively; effective drop diameter in the same t perature intervals (3 tables), and a summary of all observations for each year 1943–52 (liq water content, drop diameter, height above cloud base, density of ice, mean wind speed temperature; and extremes of wind and temperature, and cases of fog at > and <0° *Subject Headings:* **1. Ice frequencies 2. Icing conditions 3. Liquid water content of 4. Drop size distribution in ice 5. Mt. Washington, N. H.**—*M.R.*

FOG

See: **Fog classification & forecasting** (Gal'tsov), 9.11–19.

CLOUDS

See also: **Albedo of clouds** (Peugh, Melnick), 9.11–26; **Liquid water content of clouds** (Miura), 9.11–124; . . . (Owens), 9.11–125; **Solar energy as related to cloudiness and sunshine duration** (Elnesr, Firesa), 9.11–201; **Cumulus clouds produced by vertical currents** (Vul'fson), 9.11–225.

9.11–242 551.576.11:551.508.7

Keily, D. P., **Electric probe drop counter.** Massachusetts Institute of Technolog Dept. of Meteorology, Contract AF 19(122)-245, Scientific Report, No. 6, Sept. 15, 195 18 p. 9 figs. (incl. photos), 15 refs. **DWB** (M76.11 M414ms)—An instrument is describ which detects, counts, and sizes natural cloud droplets in the size range of 4 to 60 micro diameter, at a rate of several thousand per second, by electrical means. *Subject Headin* **1. Electric cloud drop counters.**—*Author's abstract.*

9.11–243 551.576.4:629.1

*Clodman, J., **The distribution of cirriform clouds.** *Canada. Meteorological Divisio CIR.* 2737, TEC. 227, Jan. 3, **1956.** 10 p. 4 figs., 9 tables, 7 refs. **DLC**—Data from abo 2000 high level aircraft reports provided by Royal Canadian Air Force stations in vario parts of Canada are analyzed to show the proportion of time an aircraft flying at 30,000, 35,0 or 40,000 ft would be flying in cirrus cloud. Variation with undercast and precip., geograph variation, seasonal variation thickness of cirrus layers, relation to upper air temperatur synoptic situation, tropopause, visibility, etc., are shown in tables. Forecasting base cirrus is also discussed. Nomograms applicable at various seasons to various zones in Canad show % of occurrence vs. height. *Subject Headings:* **1. Cirrus height frequencies 2. Cirru forecasting 3. Aircraft reports 4. Canada.**—*M.R.*

9.11–244 551.576.4:551.508.762:551.508.9

*Morton, William C., III, and Haig, Thomas O., **Variations of atmospheric transmissivit and cloud height at Newark.** *U. S. Air Force. Cambridge Research Center, Air Force Survey in Geophysics*, No. 91, Jan. **1958.** 32 p. 7 figs., 4 tables. **DWB, DLC**—Data derived fro ceilometer-transmissometers have been examined to determine the feasibility of using centrally located instrument to approximate conditions in the approach zone. Data wer gathered simultaneously from two sites, each equipped with a Cloud Height Set, AN/GMQ-13 and Transmissometer, AN/GMQ-10. The sites were located near the middle marker (Clou Height Set) and End-of-Runway (Transmissometer), and approximately one mile away in th middle of Newark Airport, Newark, N. J. It is concluded that the instruments should b located as near as possible to the region in space where the measurement is of operationa importance. *Subject Headings:* **1. Ceilometer observations 2. Cloud height data 3. Trans missometers 4. Newark, N. J.**—*Authors' abstract.*

PRECIPITATION

See also: **Pluviometry** (Barat), 9.11–15; **Drought and summer rainfall anomalies, Germany** (Clauss), 9.11–16; **Antarctic precip. & evap. data** (Loewe), 9.11–50; **Precip. forecasting** (Smebye), 9.11–133; **Radioactive rainwater** (Miyake), 9.11–173.

9.11–245 551.577:551.311:631.4

*Woodburn, Russell and Kozachyn, John, **A study of relative erodability of a group of ssissippi gully soils.** *American Geophysical Union, Transactions*, 37(6):749–753, Dec. **1956.** gs., 2 tables, 6 refs. **DWB, DLC**—Erosion tests in laboratory by the Woodburn (1948) ificial rain of splash technique, using various soils, showed a wide range of variability ween these soils. However, results of splash tests, while agreeing with aggregate stability ts, do not agree with actual splash erosion caused by natural rain over a period of 29 months '51–54). It was thought that a high percentage of the rains are below the critical intensity erosion. In the case of sandy soil the laboratory rain eroded 3 times as much as the natural n. (Work was done on 23 small reservoirs in N. Mississippi in 1951.) *Subject Headings:* **Rainfall soil erosion 2. Soil erosion experiments 3. Northern Mississippi.**—*M.R.*

9.11–246 551.577.11

†Weickmann, H. K. (*Signal Corps Eng. Labs.*), **Physics of precipitation.** *Meteorological nographs* (American Meteorological Society), 3(12/20):226–255, July **1957.** 23 figs., ables, bibliog. p. 253–255, 20 eqs. **DWB, DLC**—After pointing out the shortcomings of the rgeron-Findeisen theory of precipitation, the advantages of a dynamic conception of pre- itation formation and the water budget of precipitation, the author reviews contemporary owledge on the physics of precipitation with special reference to the period 1951–1955. he subjects discussed are as follows: properties of precipitation particles—sizes, shapes, fall locities and growth of precipitation droplets, fall velocity of snow crystals, of soft hail rouped) and of hailstones, the shape and internal structure of hailstones; the collection iciency of precipitation particles, Albrecht's theory of collection efficiency, collection effi- ncies of raindrops, hailstones, soft hail, and snow crystals; size distribution and concentration precipitation particles; water content of precipitation, the mechanism of continuous pre- itation, the ice-crystal droplet mechanism, the use of knowledge of the formation and owth of ice crystals as aerological sondes; Cunningham's analysis of cyclonic precipitation, eoretical analysis of a single warm front model, the artificial increase of continuous pre- itation; shower and thunderstorm precipitation, including the coalescence mechanism, the rmation of trigger particles, radar data on the formation of shower precipitation, the growth ocess of droplets in shower precipitation, the characteristics of thunderstorm precipitation, e seedability of thunderstorms, hailstorm precipitation and hail prevention. *Subject Head- gs:* **1. Precipitation physics 2. Bergeron-Findeisen theory.**—*I.L.D.*

9.11–247 551.577.21:551.579

Bradbury, Dorothy L., **Moisture analysis and water budget in some nondeveloping cases.** icago. Univ. Dept. of Meteorology, Contract AF 19(604)-2179, Scientific Report, No. 4, ov. **1957.** 12 p. 3 figs., 3 refs. **DWB** (M055 C532sr)—The water budget was computed ice daily over a large area of central and eastern U. S. for a two-week period. With the e of the simplified water balance equation fairly good agreement was found between the mputed and observed amounts of precipitation. The patterns of water vapor storage were mpared with those of the observed precipitation and it was found that, in general, the axes the maximum precipitation areas lie on or to the left of the axes of the patterns of water por storage. *Subject Headings:* **1. Water budget 2. Precipitation amounts 3. United ates.**—*Author's abstract.*

9.11–248 551.577.2(778)

*McQuigg, J. D. (*State Climatologist, U. S. W. B., Columbia, Mo.*), **Precipitation in Missouri.** *S. Weather Bureau, Weekly Weather and Crop Bulletin*, 44(39):7–8, Sept. 30, **1957.** 8 graphs, . **DWB, DLC**—A comparative chart of the monthly cumulative frequencies of precipitation d potential evapotranspiration in Columbia, Tarkio, Sikeston, Springfield, Hannibal and . Louis shows a relatively steady increase and decrease throughout the various years of

observation at each place. The graphs portray the times when evaporation and transpirat take most of the incoming precipitation. *Subject Headings:* **1. Precipitation charts 2. M souri.**—*N.N.*

9.11–249 551.577.38(7

†Villmow, Jack R. (*Wellsley College*), **The nature and origin of the Canadian Dry B** *Association of American Geographers, Annals*, 46(2):211–232, June **1956.** 26 figs., table refs.+29 foot-refs. **DWB, DLC**—A thorough study of character and causes of the anoma annual and seasonal temperature and precip. distribution in southern Alberta and Saska ewan, where a belt (called Palliser's Triangle) of moisture deficit of −25 (THORNTHWAIT 1948 classification) exists, is presented with numerous charts, graphs and data. Ann potential evapotranspiration amounts to 1.75× the precip. Summer and winter temps. sl extreme variability from year to year and are unusually warm during dry years. The belt is explained by a deficiency (in summer) in frequency of cyclonic and an increase frequency of anticyclonic passages, as shown in maps of Canada. This process in turn thought to be due to the location of the mean jet stream in July 600 mi to the south or south of the Canadian border, leaving this dry belt in an area of subsidence and inflow north of the jet. Divergence calculations show that it is in a region of marked horizon divergence both at the surfaces and aloft. Longest period of drought (<.25″ of precip wet season) is >75 days. *Subject Headings:* **1. Dry belts 2. Drought 3. Palliser's Trian Canada.**—*M.R.*

9.11–250 551.577.51(4

§Spinnangr, Finn and Johansen, Harald, **On the influence of the orography in south Norway on instability showers from the sea.** *Meteorologiske Annaler*, Oslo, 4(3):18–35, 19 13 figs., 7 foot-refs. **DLC**—On the basis of a detailed synoptic analysis of a weather situat on Oct. 21–22, 1954 over the N.E. Atlantic, the North Sea and southern Norway includ aerological investigations and of the precipitation over Southern Norway during the same ti the authors attempt to explain the fact that (1) in Maritime Polar air currents from N W and SW a marked maximum zone of precipitation is found at some distance (30–50 k from the coast, this maximum is closest to the coast where the mountains are highest and fr this maximum the precipitation amounts decrease inwards and upwards to the higher wat shed between western and eastern Norway and (2) the upper watershed does not form sharp "Weathershed." The explanation is as follows: The developing showers enter Vestlandet will have gone through their life cycle within the maximum zone. The precipitat over the inner districts of Vestlandet may be due partly to showers formed over land ins the coast and still not having been exhausted, and partly to showers formed behind the ma mum zone in air which has lost much of its moisture content there, and which is cut off fr effective supply of moisture from the surface. Near the upper watershed these may ha come to their full development, but just behind the upper watershed a sinking of the air a thereby a dissolving of the showers begins. *Subject Headings:* **1. Orographic rainfall 2. P cipitation formation 3. Norway.**—*I.L.D.*

RAIN AND SNOW

See also: **Tree & snow line** (Hermes), 9.11–21; **Canadian Arctic snow cover** (Corbel), 9.11–43; **Snow studies, Maudheim,** (Schytt), 9.11–59; **Snow sampling** (Ônuma), 9.11–110; **Inversions over snow surfaces** (Johnson), 9.11–211; **Snow crystal nuclei** (Kumai), 9.11–232; **Ice crystal nuclei** (Maruyama), 9.11–234; **Freezing nuclei** (Mason), 9.11–235; **Snow crystal nuclei** (Nakaya), 9.11–236.

9.11–251 551.578.1:551.515

Goto, T., **Case study of relationship between convergence line and precipitation Shimane Prefecture.** *Journal of Meteorological Research*, Tokyo, 8(11):671–675, Dec. 195 8 figs., table, 10 refs. In Japanese; English summary p. 671. **DWB, DLC**—In this paper t author examined the relationship between a local convergence line and precipitation associat with typhoon No. 5415 in Shimane Prefecture. Principal results are as follows: 1) A lo

vergence line was generated in direction S.W. to N.E. by orographic effect; 2) The amount precipitation was rather larger along the convergence line; 3) The air temperature was ner lower along the convergence line; 4) Seven precipitation groups associated with typhoon 5415 in Shimane Prefecture were pointed out. *Subject Headings:* **1. Convergence line-cipitation relationships 2. Typhoon "Maria" (1954) 3. Shimane Prefecture, Japan.**—*thor's abstract.*

9.11–252 551.578.11

Atlas, David and Chmela, Albert C. (*both, G.R.D., AFCRC, Bedford, Mass.*), **Physical-loptic variations of raindrop size parameters.** *Weather Radar Conference, 6th, Cambridge, ss., March 26–28, 1957, Proceedings*, pub. **1957.** p. 21–29. 5 figs., 3 tables, 13 refs., 9 eqs. **WB** (M01.81 R124pc)—It is verified that the rain intensity corresponding to most size-ctra can be represented by a uniform collection of drops with size equal to the median ume diameter, D_0. This, and the strong preference for a particular distribution, permit velopment of a rainfall parameter diagram on which any two of the variables R—rain ensity, Z—reflectivity factor, W—water content, and D_0 fix the other two. The physical gins of the Z-R correlations for different types of rainfall are thereby explained. The more otle variations in the Z-R function within stratiform rain also have physical origins: growth cloud accretion and the superposition of drizzle skew the size spectra toward the small end ring small coefficients and large exponents on Z-R; drop sorting by wind shear and evapora-n act conversely. Drop sorting is perhaps the strongest influence. Although these proc-ses tend to occur in certain preferred regions of a cyclone model (sorting and evaporation th high Z's in the initial stratiform rain; growth and drizzle combine to give low Z's in well veloped warm front rain), the synoptic situation alone is inadequate to specify either the fluences or the appropriate Z-R functions. PPI and RHI patterns are of considerably eater value in this regard. Preliminary results suggest that a random array of small cells the PPI implies high Z's; a large uniform echo mass, low Z's. If the best regression line is lected for a particular day, a reduction of about 10% in the estimating error may be expected om that in using an overall fixed line. The extreme effects of drop sorting suggest echo eraging for 5 to 10 minutes. *Subject Headings:* **1. Raindrop size parameters 2. Rainfall rameter diagram.**—*Authors' abstract.*

9.11–253 551.578.11

Wexler, Raymond (*Blue Hill Met. Obs., Harvard*) and Atlas, David (*Geophys. Res. Direct-ate, A.F. Camb. Res. Center*), **Moisture supply and growth of stratiform precipitation.** Blue ill Meteorological Observatory, Contract AF 19(604)-950, Meteorological Radar Studies, o. 6, June 27, **1957.** 19 p. 3 figs., 20 refs., 29 eqs. **DWB.** Also in: *Weather Radar Con-rence, 6th, Cambridge, Mass., March 26–28, 1957, Proceedings*, pub. **1957.** p. 69–76, fig., tables, 17 refs., 14 eqs. **DWB** (M01.81 R124pc)—For a distribution of precipitation particle zes in a model cloud, assumed to follow a wet adiabat, theoretical calculations are made for gions of storage or depletion of cloud liquid water and the resultant effects on the rate of owth of precipitation. In the cloud below the melting layer, it is found that cloud liquid ater is stored in amounts of 0.2 to 0.3 g m^{-3} and that $\partial R/\partial z$ is about 5% smaller than would expected from the rate of supply of water by the updraft. Within the melting layer, cloud uid water is depleted sharply and $\partial R/\partial z$ is greater by a factor of about $\frac{1}{3}$ than the rate of pply. In a narrow band just above the melting layer, storage of cloud liquid water again kes place, but, as the rate of sublimation increases at colder temperatures, cloud liquid water again depleted and reaches a value of zero at about −4C for 2 mm hr^{-1} rain and above 10C for 10 mm hr^{-1} rain. The results are compared with observations, and the implications the differences, particularly with respect to the vertical velocity profile, are discussed. *bject Headings:* **1. Drop size distribution 2. Water content of clouds.**—*Author's abstract.*

9.11–254 551.578.41:546.13

Koike, Tomiji and Hirota, Hidenori, **Study on the chlorine ion contained in the snowfall.** *urnal of Meteorological Research*, Tokyo, 6(7):274–276, Sept. **1954.** 6 figs., 3 refs. In panese; English summary p. 274. **DWB**—The chlorine ion contained in precipitation in the nths Jan. and Feb. 1951 at Niigata is quantitatively analyzed and the following conclusions

are obtained: 1) In general, the air of northerly wind, that is the wind from the sea, cont more chlorine ion (Cl mg/L) than that of southerly wind. 2) Cl(mg/L) increases in propor to wind velocity. 3) The cold air mass of continental origin contains ions of larger volu than those contained in the warm air mass of oceanic origin. *Subject Headings:* **1. Chlo content of snow 2. Snow composition 3. Niigata, Japan.**—*Authors' abstract.*

9.11–255 551.578

Magono, Choji (*Hokkaido Univ.*), **On snowflakes.** *Weather Radar Conference, Cambridge, Mass., March 26–28, 1957, Proceedings*, pub. **1957.** p. 31–36. 9 figs., ph 2 refs., eqs. **DWB** (M01.81 R124pc)—A semitheoretical formula for the fall velocity of sn flakes is found to agree with observation for the larger flakes. The relations between sha fall velocity and other physical properties of snowflakes are summarized. Measured distri tions of raindrop sizes agree with the MARSHALL and PALMER distribution. However, measu distributions of snowflake sizes are found to be in disagreement with the equivalent MARSH and PALMER distribution. *Subject Headings:* **1. Snowflake velocities 2. Snowflake s distribution.**—*Author's abstract.*

9.11–256 551.578.46(

*Boughner, C. C. and Potter, J. G., **Snow cover in Canada.** *Weatherwise*, 6(6):155–1 170–171, Dec. **1953.** figs. **DWB**—Isopleth charts show mean annual snowfall (20″ interv to 200″), mean annual date of first and last and number of days with snow cover of 1″ more, average maximum depth of snow in inches and computed maximum snow load on horizontal surface (lbs/sq ft). The conditions in western, Prairie, eastern, northweste Canada and the Canadian Archipelago are reviewed with respect to the data shown on t charts. The heaviest snows (except for the west slope of the Cascade or Coastal Rang and greatest snow loads are found in the interior of Quebec and Labrador where the avera annual snowfall is 10 to 17 ft, the average maximum depth 5 ft or more and the maximu snow load >90 lbs/sq ft. In the Prairies and Canadian Archipelago the respective values a <40″, <20″ and <30 lbs/sq ft. *Subject Headings:* **1. Snow cover 2. Snow load da 3. Canada 4. Canadian Arctic.**—*M.R.*

HYDROMETEOROLOGY

See also: **Runoff forecasting, Ontario** (Arden, Milne), 9.11–140; **Flood wave models** (Haque), 9.11–196; **Soil moisture** (Volobuev), 9.11–212; **Moisture analysis and water budget** (Bradbury), 9.11–247.

9.11–257 551.579:519.241

Visser, B. (*Provinciale Waterstaat van Zuid-Holland, 's-Gravenhage*), **Het werken m frequentieverdelingen.** [Application of frequency distributions.] (In: Nederlandse Centra Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek. Commissie voor H drologische Onderzoek, **Verslagen technische bijeenkomsten 7–10 en Verslag inzake h verdampingsonderzoek in de Rottegatspolder 1947–1952.** pub. 's-Gravenhage, **1955.** p. 4 49. 4 figs., 1 table. English summary, p. 261–262; French summary, p. 283–284.) **DWB** In this examination of the use of frequency distributions in treating hydrological data, t author in general agreement with the point of view of R. A. FISHER, discusses the characte istics of the Gaussian distribution and considers in detail PEARSON's arithmetical and GOO RICH's graphical methods and their application to the frequency analysis of hydrological dat *Subject Headings:* **1. Frequency distributions 2. Hydrology.**—*I.L.D.*

9.11–258 551.579

Velikanova, T. I., **O poteriakh vesennego stoka na severe Evropeiskoĭ chasti SSS** [Spring run-off losses in the northern European part of the U.S.S.R.] *Meteorologiia i Gidr logiia*, No. 1:19–25, Jan. **1957.** 3 figs., table, 3 refs., eq. **DWB, DLC**—On the basis of existin theoretical conceptions regarding the absorption and retention of melt water and on the bas of available field observations and laboratory data, the author attempts to determine th possible magnitude of total losses of runoff, the nature of the variations in runoff losses an

principal factors influencing variations in losses from year to year in the area under con-ration. The author discusses the effect of forest on snow accumulation during the winter, er retention in forest soils during the spring, the relationship between the velocity of in-ration of water in soil and its dependence upon soil type, upon initial soil humidity, etc. equation for runoff is presented, namely

$$y = x - (P_{max} - P_0)^{th} \frac{x}{P_{max} - P_0},$$

ere y = flow in mm, x = amount of water formed in the basin (mm), P_{max} = maximum possible er layer which the basin can hold and P_o = variation in the surface capacity of the basin, acity as a function of preceding autumn conditions. Graphs of the dependence of total ng runoff upon the maximum water reserves in the snow cover, upon precipitation during spring high water period and the fall readiness of the basin (for Northern European .S.R.), a map showing the distribution of total losses of spring runoff (average for the period 6–1951) and a table giving total runoff losses for 23 basins for the period 1936–1951 are sented. *Subject Headings:* **1. Runoff 2. Water losses 3. Northern U.S.S.R.**—*I.L.D.*

9.11–259 551.579.2(52)

Takeda, Shigenochi (*Forest Experiment Station, Tokyo*), **Relations between snow melt stream flow.** *Researches on Snow and Ice*, Tokyo, No. 2:105–114, Jan. **1955.** 4 figs., ables. In Japanese. **DWB**—The relative relation between snow melt and runoff (stream v) in the Dakara River area (N. 36°51′, E. 139°01′; Gunba Prefect.) is studied, and the fol-ing empirical equation is obtained:

$$D_A = 0.9(P_A - 85),$$

ere D_A is annual runoff (mm) and P_A is annual rainfall (mm). Monthly average runoff, erage snow cover depth, actual runoff and estimated annual rainfall in the water source a from 1938–1952 are tabulated and graphs of snow cover depth vs. runoff and estimated nfall are given. Snow cover (deposited snow) starts to build up from late Nov. to Dec. h sudden decrease of runoff (stream flow), the decrease of runoff continues until late March, inning of snow melt period. Snow melt (water) influences the runoff up to mid-July. *bject Headings:* **1. Snow melt runoff 2. Rainfall-runoff relationships 3. Dakara River sin, Japan.**—*J. Woo.*

9.11–260 551.579.4(943)

Brunt, A. T. (*Div. Office, Brisbane*), **The record floods in southeast Queensland.** *Aus-lian Meteorological Magazine*, Melbourne, No. 15:12–30, Dec. **1956.** 9 figs. (incl. photos), ables, 4 refs. **DWB**—On Jan. 20 and 21, 1956, rainfall of unprecedented intensity was eived over parts of the Condamine and Macintyre catchment areas in southeast Queensland. neral flooding reached severe proportions in the middle reaches of the Condamine and in thern areas of the Macintyre basin. Macintyre Brook at Inglewood rose more than four t above the level previously thought by river engineers to be the flood extreme. This ort includes the study of the meteorological situation leading up to the flood rains and the rm mechanism involved. The areal and temporal distribution of the rainfall is described l details of the rainfall intensity outlined. Maximization of the storm is undertaken using nethod of storm transposition in the evaluation of maximum possible rainfall over the cintyre catchment. The three following floods in the series are briefly described and an essment made of the relation of the January flood to the flood extreme. *Subject Headings:* **Record floods 2. Floods, Southeast Queensland (Jan. 1956) 3. Southeast Queensland, stralia.**—*Author's abstract.*

9.11–261 551.579.4(47)

Kaganer, M. S. and Ogievskaia, V. A., **Amplitudy kolebaniĭ urovnia vody v rekakh zarpatskoĭ oblasti (bassein r. Dunaĭ).** [Amplitudes of water level fluctuations in the rivers he Transcarpathian Region (Danube basin).] *Ukraine. Nauchno-Issledovatel'skii Gidro-eorologischeskii Institut, Trudy*, 4:93–100, **1955.** table, 10 refs.—Using published data, the hor compiled data on the maximum and minimum water levels of the rivers of the Ukranian

part of the Danube River basin. The table contains data on dates of maximum and minim levels, amplitude, years of observation, area of catchment basin, coordinates of observa point, etc. *Subject Headings:* **1. River stages 2. Transcarpathian Oblast, U.S.S.R.**—*I.L.*

9.11–262 551.579.4

Kotliarskiĭ, I. A. and Terterov, A. A., **Selevye potoki na rekakh Kishchaĭ i Shinc** [Flash floods of the Kishchaĭ and Shinchaĭ Rivers.] *Meteorologiia i Gidrologiia*, Mos No. 8:39–40, Aug. **1956.** table. **DWB, DLC**—The southern slopes of the main Cauca Range within the Azerbaidzhan SSR is one of the districts in the U.S.S.R. that is most sub to flash floods. The authors describe a flash flood that occurred Aug. 14–15, 1955 as a re of terrestrial rain in the basins of the Shinchaĭ and Kishchaĭ Rivers. A description is gi of the origin, duration and extent of the flash flood. *Subject Headings:* **1. Flash floods 2. A baidzhan S.S.R.**—*I.L.D.*

9.11–263 551.579.4(282.2

§Lucht, F. (*Hamburg*), **Die meteorologischen Ursachen des Hochwassers der Elbe Juli 1954.** [Meteorological causes for the flood of the Elbe River in July 1954.] *Die Was wirtschaft*, Stuttgart, 46(3):64–68, Dec. **1955.** 3 figs., 4 tables, 9 refs. **DLC**—The so-ca Vb weather situation, a low pressure area moving from the Adriatic towards the Baltic is responsible for most of the floods in Eastern Middle Europe. Surface and 500 mb isol are shown, daily precipitation amounts over catchment areas are given and resulting w levels presented. *Subject Headings:* **1. Floods 2. Elbe River.**—*A.A.*

9.11–264 551.579.5:551

†Blagoveshchenskiĭ, E. N., **O kondensatsionnoĭ vlage v pochvakh pustyn'.** [Condensat moisture in desert soils.] (In: Akademiia Nauk SSSR. Botanicheskiĭ Institut, **Pustyni SS i ikh osvoenie,** Vol. 2. Moscow, Izdat. Akademii Nauk SSSR, **1954.** p. 508–519. 7 tab 27 refs.) **DLC**—Experimental data are presented on the moisture content of desert g soils at various depths from 0 to 450 cm when moisture from rainfall and from vapor of gro water was excluded. The seasonal moisture content of the soil is analyzed and evidenc presented for the atmospheric origin of soil moisture in desert regions. The physical fact in the absorption of atmospheric moisture by the soil are analyzed. *Subject Headings:* **1. De soil moisture 2. Condensation processes in soil.**—*I.L.D.*

9.11–265 551.57

Oliferov, A. N., **Agrometeorologicheskoe obosnovanie novykh metodov podgotovki poc pod lesnye nasazhdeniia v Vostochnom Krymu.** [The agrometeorological basis for n methods of preparing soils undergoing afforestation in the eastern Crimea.] *Meteorologi Gidrologiia*, Leningrad, No. 8:35–37, Aug. **1956.** fig., 2 tables, 3 refs. **DWB, DLC**—T dynamics of the productive reserves of soil moisture are associated with various method preparing soil for afforestation. Soil moisture was studied at depths of 10 to 75 cm. T mean monthly moisture reserves, the maximum and minimum moisture reserves at the 75 depth and the minimum soil moisture in percent of absolute dry weight corresponding such techniques of soil preparation as compact method, terrace width of one meter, etc. treated. Mechanical means of preparing the soil for forest crops enable successful afforestat under the severe conditions of the eastern Crimea. *Subject Headings:* **1. Soil moisture co servation 2. Crimea.**—*I.L.D.*

9.11–266 551.579.5:551.31

Tanaka, S.; Sano, H. and Kakinuma, S., **Relation of soil moisture to the wind velo required to initiate soil movement (Study on the control of wind-erosion, Pt. 1).** *Journa Agricultural Meteorology*, Tokyo, 10(1/2):57–60, Dec. **1954.** 2 figs., 2 tables, 4 refs. Japanese; English summary p. 60. **DWB**—Among methods to prevent wind erosion, that increasing resistance-erosive nature in soil is the most suitable. A basic experiment was ma on the relation between the amount of water contained in quartz sand and the wind veloc required to initiate soil movement, with the intention of preventing erosion by means irrigation. The diameters of seven kinds of quartz sand particles are respectively 2.0, 1.0, 0

0.2, 0.1, 0.05 mm. The Effel type wind tunnel of sand, the length of which is 8.0 m, was d. The experimental room is 3.0 m in length. On the floor pebbles with diameters from mm to 6.0 mm are laid and in the midst the materials to be tested are put. Those of 0.2 n in diameter are most apt to move, while those under 0.2 mm have more resistance-erosive dency. In accordance with the increase of the amount of contained water, each size of rticle shows increased resistance-erosive nature when the amount of contained water reaches ertain degree, resistance-erosiveness also rises suddenly. The relation between the amount water contained in the mixture of more than two kinds of particles and the wind velocity uired to initiate soil movement is represented by the following expression

$$V_{(n)} = V_{a(n)}r + V_{b(n)}r' + V_{c(n)}r'' + \cdots \pm e$$

$_{n)}\cdots$the wind velocity required to initiate soil movement, in the case that the percentage of ntained water is n. $V_{a(n)}$, $V_{b(n)}$, $V_{c(n)}$—the same as above, of the particle, diameters of ich are a, b and c. r, r', r''—Percentage of mixture. e—Variation. (N.B.) The range which this expression is to be applied is below the point where resistance-erosiveness in-eases abruptly. *Subject Headings:* **1. Soil moisture effect on wind erosion 2. Wind erosion.** *From authors' abstract.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Plant chemistry and climate** (Sharapov), 9.11–10.

9.11–267 551.58:519.241.6

†Iudin, M. I., **Izmenchivost' meteorologicheskikh elementov v prostranstve i vremeni.** Spatial and temporal variability of meteorological elements.] (In: Budyko, M. I. (ed.), **. I. Voeĭkov i sovremennye problemy klimatologii.** Leningrad, **1956.** p. 175–192. 7 figs., tables, 43 refs.) **DWB**—On the basis of a review of Soviet and Western literature, the uthor presents a detailed discussion of the interdiurnal variability of atmospheric temperature nd pressure, variability of the meteorological elements in space and the nature of differences a horizontal direction, the fundamental statistical description of the meteorological elements, ne structure of meteorological fields, etc. *Subject Heading:* **1. Variability of meteorological lements.**—*I.L.D.*

9.11–268 551.58

Thornthwaite, C. W. (*President of CCI*), **The task ahead in climatology: Presidential ddress at the second session of the Commission for Climatology, Washington, Jan. 1957.** *Vorld Meteorological Organization, WMO Bulletin*, 6(1):2–7, Jan. **1957. DWB**—The status f world climatology now, as compared with its status 4 years ago when the author became resident of CCI, is reviewed with emphasis on the fact that rapid progress has been made in me areas. Heat and moisture exchange from soil or plant surfaces to the air constitute ne of the main problems. Topoclimatology, field climatology, microclimatology and other lated problems or facets of climatology are discussed. Applications to agriculture, archi-cture, industry and defense are mentioned also. *Subject Heading:* **1. Climatology.**—*M.R.*

CLIMATE OF PARTICULAR PLACES

See also: **Climate New Zealand** (Garnier), 9.11–4; **Climate, Frankfurt a.M.** (Mollwo), 9.11–24; **Marine climatic atlas, Indian Ocean,** 9.11–29; **Arctic equipment, Greenland** (Weiss), 9.11–45; **Climate, Graham Land** (Burdecki), 9.11–46; **Climate, Sub-Antarctic Islands** (Fabricius), 9.11–47; **Climate, Antarctic Coast** (Vowinckel), 9.11–55; **Climate, Antarctic Ocean** (Vowinckel), 9.11–56; **Climatic data, Belgium** (Sneyers), 9.11–117.

9.11–269 551.582(472)

*Pokrovskaia, Taisiia Vasil'evna, **Klimat Leningrada.** [Climate of Leningrad.] Lenin-ad, Gidrometizdat, **1957.** 114 p. 36 figs., tables. **DLC** (QC989.R6L58)—A substantial

pamphlet giving in popular form (3000 copies) the history of meteorological observation
St. Petersburg from 1657 to the Revolution and at Leningrad since, with many illustrat
of old records and recent equipment, followed by general description of the climate and of
several climatic elements. Wind, radiation, cloudiness, temp., heat and cold waves, pre
etc., and then a series of chapters on the seasons: winter, spring, summer, autumn; clim
variations or changes and their causes; the city (urban) effects on microclimate, especially
pollution, radiation, temp. humidity, cloud and fog; the microclimate in various outly
regions during the different seasons; snow cover and, finally, tables of data are inclu
Subject Headings: **1. Climate of Leningrad 2. History of climatic records 3. Urban clima
4. Climatic changes 5. Leningrad, U.S.S.R.**—*M.R.*

9.11–270 551.582(7

Courtney, F. E., Jr. (*Lockheed Aircraft Corp., Ga. Div.*), **The specification of clima
logical probabilities for the Georgia Nuclear Aircraft Laboratory.** *National Conference
Applied Meteorology, Hartford, Conn., Oct. 1957, Proceedings*, issued **1957.** Section A:33–
7 tables, 7 figs. **DWB** (M A512pro)—The Georgia Nuclear Aircraft Laboratory is loca
some 45 mi from the nearest station of long-term climatological records. This paper conce
a detailed investigation dealing with the specifications of the probability of various weat
events occurring on the site based on off-site data. It is believed that some of the techniq
employed in completing this study are unique and would have application to many ot
areas where site selection for industrial activity is related to the frequency of weather eve
Subject Headings: **1. Climatic probabilities 2. Georgia Nuclear Aircraft Laboratory 3. Ge
gia.**—*Author's abstract.*

9.11–271 551.582.1(791.51) 551.5

*Robison, William C. and Dodd, Arthur V., **Analogs of Yuma climate in Chinese Inn
Asia.** *U. S. Quartermaster Research and Developmental Center. Environmental Protect
Div., Yuma Analogs*, No. 6, Dec. **1955.** 16 p. 10 figs., 11 tables, 16 refs. **DWB** (M8
U586an)—No part of Chinese Inner Asia is climatically analogous to Yuma in both win
and summer. Winters are far too cold everywhere to be considered analogous, and summ
are too cool in most places, but in summer one small area—the Turfan Depression in Sinkiang
is much like Yuma in respect to temp. and precip. Considering only mean temperature
the warmest month, for which the Yuma value is 91°F the area of comparability (within 5°
also includes the valley of the Wei Ho in Shensi province. A large portion of the study ar
has mean annual precipitation between 2 and 6 in., and is therefore considered analogous to t
Yuma mean of 3.4 in. Much of the Tarim Basin has a mean of less than 2 in., and is th
semi-analogous to Yuma. The entire area has mean cloudiness greater than 3.0 in Jul
too high to be analogous to the Yuma average of 1.6 tenths. Mean July wind speeds a
analogous or semi-analogous (less than 12 mph) at stations for which data are availab
Most of Chinese Inner Asia has lower dew points than Yuma; only in the more humid southea
are dew points of the same order as or higher than the August value of 64°F at Yuma. Are
of analogy of pertinent climatic elements are presented in a series of maps at the end of t
report. *Subject Headings:* **1. Climatic analogs 2. Climate of Yuma, Ariz. 3. Yuma, Ari
4. Chinese Inner Asia.**—*Authors' abstract.*

9.11–272 551.582.1/2(7

Visher, Stephen S., **Climatic contrasts in the United States.** *Scientific Monthly*, N. Y
81(3):115–122, Sept. **1955.** 15 figs., 3 refs. **DLC, DWB**—Contrasts in temperature, heatin
and cooling degree days, frost free season, rainfall, evaporation, wind, sunshine, etc. fro
season to season in various parts of the U. S. are emphasized in this general article on th
climates of the U. S. Charts selected from the author's recent **Climatic Atlas of the U. S
(*see* 6.5–2, May 1955, *MAB*)** are presented to illustrate these variations. Extremes an
frequencies are considered more significant than mean values. *Subject Headings:* **1. Climati
charts of United States 2. Climate of the United States 3. United States.**—*M.R.*

9.11–273 551.582.2(74

Kantor, A. J. (*State Climatologist, U. S. W. B., Trenton, N. J.*), **The climate of New Jerse
U. S. Weather Bureau, Weekly Weather and Crop Bulletin, 44(7):7–8, Feb. 18, 1957.** 4 figs

DWB, DLC, DA—Two graphical representations are made showing the mean monthly mperatures and precipitation in the three major divisions of the state of New Jersey—the th, south and coast. In July there is a maximum mean temp. of 74.2°F (north), 75.5°F uth) and along the coast a maximum mean temp. of 73.6°F. The mean precip. for the ee divisions is highest in Aug.: 5.07 in. (north), 5.20 in. (south) and 4.91 in. for the coastal as. A map of the state showing precip., temp. and evaporation stations is included. *bject Headings:* **1. Climatic data 2. Climate of New Jersey 3. New Jersey.**—*N.N.*

CLIMATIC CHANGES

9.11–274 551.583:551.585.5

Wissmann, Hermann von; Poech, H.; Smolla, G. and Kussmaul, F., **On the role of nature d man in changing the face of the dry belt of Asia.** (In: International Symposium on Man's le in Changing the Face of the Earth, Princeton, N. J., June 1955, [**Proceedings**], ed. by . L. Thomas, Jr. Chic., Univ. of Chicago Press, **1956.** p. 279–303. 6 figs. Bibliog. p. 9–303.) **DLC** (G56.I63)—In considering the role of the desert belts of the Old World in viding humanity during parts of the Quaternary Age and thereby facilitating the develop- nt of racial units through isolation, the authors discuss changes in climate and vegetation ing glacial and interglacial periods of the last Ice Age. The climates prevailing in the trade- nd region and in the continental section of the Dry-Belt during the last Ice Age including midity and temperature characteristics, height of snow line, extent of permafrost are de- ribed. The human ecological effects of the climatic changes are considered with reference the occupance of the Dry Belt by herding steppe farmers and irrigating farmers. A map owing the vegetation zones of Eurasia in glacial times is presented. *Subject Headings:* **Climatic changes 2. Arid zones 3. Irrigation 4. Eurasia.**—*I.L.D.*

9.11–275 551.583.13:517.512.2(52)

Takahashi, T. et al., **Several days' periodicity.** *Journal of Meteorological Research,* (9):320–321, July **1951.** 2 figs., table. In Japanese. **DWB**—Application of periodogram nalysis to rainfall, temperature and pressure data for Tokyo. *Subject Headings:* **1. Periodic- ies 2. Periodogram analysis 3. Tokyo, Japan.**—*M.R.*

9.11–276 551.583.13

Visher, Stephen S. (*Indiana Univ.*), **When the seasons begin in Indiana.** *Indiana cademy of Science, Proceedings,* 55:144–146, **1945. DWB**—Notes on the effective dates of eginning of winter, spring, summer and autumn in northern, central and southern Indiana, espectively. The seasons are defined in several ways, on the basis of average temperatures r frost rather than on astronomical considerations. Thus winter begins around the first of ec., spring around the first of March, summer the first of June and autumn the first of Sept. hough there is 2–3 weeks variation from north-south or if different criteria are used. *Subject eadings:* **1. Climatic seasons 2. Indiana.**—*M.R.*

9.11–277 551.583.2

Morton, F. (*Hallstatt*), **Aus Hallstatts Vorgeschichte (Kurzer Auszug).** [From the pre- story of Hallstatt: brief extract.] *Wetter und Leben,* Vienna, 7(8/11):220–221, **1955. DLC**— s indicated by peat borings, the climate of the Hallstatt period did not differ substantially om that of today. This period falls within the older sub-Atlantic, that is during post- terglacial which began 800 B.C. and terminated 1000 A.D. The forest consisted primarily spruce, beech and fir. The climate was cooler and damper than in the preceding sub- real. The forest zone lay 100 m higher than today. *Subject Headings:* **1. Historical climates Hallstatt period 3. Hallstatt, Austria.**—*I.L.D.*

9.11–278 551.583.3

Cole, S. M., **Quaternary climate changes and sedimentary deposits.** (In his: **An outline the geology of Kenya.** Nairobi, Sir Isaac Pitman, **1950.** p. 32–39. 3 plates, map, table, bliog. p. 57–58.) **DLC**—A table showing the succession of climatic changes in Kenya during uaternary times and a table showing the correlation between East African pluvials and

European glacial periods are given. *Subject Headings:* **1. Quaternary climates 2. Clim changes 3. Kenya, Africa.**—*I.L.D.*

MICROCLIMATOLOGY

See also: **Cotton field microclimatology** (Zuev), **9.11–93.**

9.11–279 551.584(

†*Galakhov, N. N., **Mikroklimaticheskie nabliudeniia v podmoskov'e.** [Microclima observations in the vicinity of Moscow.] *Akademiia Nauk SSSR, Institut Geografii, Tru* 71:102–135, **1957.** 15 figs., 14 tables, 21 refs. **DLC** (GB236.A4)—This is a model mic climatic study of a region characterized by considerable variation in relief and by differen in vegetation zones. This study is based upon field work undertaken by the Institute Geography of the Academy of Sciences of the U.S.S.R. The author begins with a review climatic studies of the Moscow region and of earlier special microclimatic studies of this reg and then proceeds to a detailed description of the microclimatic survey. His discussion a data (presented in tables and diagrams) cover the following: microclimatic data during t nocturnal radiation regime, under diverse ecological conditions; microclimatic data during t diurnal insolation regime under diverse ecological conditions; minimum air temperature at t soil surface, diurnal variation of atmospheric temperature and humidity gradients duri different weather conditions; soil temperature; fall phytophenological phenophene unc diverse ecological conditions and changes in the character of phenological development plants as a result of man's transformation of nature. *Subject Headings:* **1. Microclimatologi research 2. Microclimatic data 3. Moscow, U.S.S.R.**—*I.L.D.*

9.11–280 551.584.2:551.588

Vinaccia, Gaetano, **The microclimatology of towns, or "polisclimatology."** Trans. frc *Journée du Bâtiment,* Nov. **1954.** 5 p. typescript. **DWB** (M84.2 V766m)—Notes polisclimatology, reciting historical and recent differences of climate in cities, especially Rome. A study of solar radiation and illumination effects can be made by using on mod of cities a "Poliseliometro" (devised by the author) or a gadget that measures urban ligh either with artificial or with natural sunlight as a source. *Subject Headings:* **1. Urban climat 2. Polisclimatology.**—*M.R.*

9.11–281 551.584.42:676.

Akhmedov, G., **Nekotorye cherty mikroklimata liutsernovogo polia.** [Certain micr climatic characteristics of an alfalfa field.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institu Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 5 69. 5 figs., 6 tables, 6 refs.) **DLC**—On the basis of meteorological observations made duri 1954 at Boz-Su, the author describes the relationship between the microclimate of an alfal field upon the regime of hay cutting and upon soil moisture. Measurements were made direct and diffuse radiation, radiation balance, temperature and humidity at heights of 1, 1 20, 50, 100 and 200 cm, soil temperature at depths of 5, 10, 15 and 20 cm, evaporation, win velocity and direction at 20, 50 and 150 cm, shading and illumination in the center of the fiel radiational balance distribution and albedo. Data in graphs and tables include the following daily variations of the constituents of the radiational balance of an alfalfa field for a give day, daily variation of radiational balance of a cut and uncut alfalfa field, vertical distributio of absolute humidity over a cut and uncut field, daily and nocturnal variation of absolut humidity over a cut and uncut field, vertical distribution of wind velocity, daily variation wind velocity, distribution of soil temperature at various depths, etc. *Subject Heading* **1. Field microclimatology 2. Alfalfa field microclimate 3. Boz-Su, U.S.S.R.**—*I.L.D.*

9.11–282 551.584.42:633.1

Maruyama, E. (*Central Met. Obs., Tokyo*), **Studies on the relations between the micr climate and field surface condition, Pt. 1–2.** *Journal of Agricultural Meteorology,* Toky 6(3/4):151–156, Aug. **1951.** 5 figs., 6 tables, 4 eqs. In Japanese; English summaries p. 15 156. **DWB**—Results of observations on microclimate, especially on air temperature, made i

heat field and in an unplanted area are reported in Pt. I. Data on air temperature over a at field at 150 and 10 cm with varying wind speed are presented in graphs. Comparative n on temperature at various heights over a wheat field and over an unplanted area are sented. Variations in temperature are attributed to eddy conductance for which the nor gives theoretical values. In Pt. II data on diurnal variation of heat transfer are sented, values for the eddy conductivity in a wheat field are calculated and the effect of mal mechanisms associated with different growth conditions is investigated. *Subject dings:* **1. Field microclimatology 2. Wheat field microclimate.**—*From author's abstracts.*

9.11–283 551.584.43:633.3:633.491

Abe, I. and Takahashi, S. (*Tôhoku Agri. Experiment Station*), **Studies on the microclimate growth of soybeans, interplanting in the potato fields.** *Journal of Agricultural Meteorology*, yo, 11(3):103–106, Dec. **1955.** fig., 5 tables. In Japanese; English summary p. 103–106. B—The experiments were carried out to make clear the microclimate and the growth of beans, interplanting in potato fields. The results were as follows: 1) The yield of main p (potato) was not so decreased by interplanting soybeans, and the total yields of both ps were much increased as compared with main crop only. 2) It seemed that the micro- nate formed by interplanting was less affected by the growth of the main crop. 3) In the lier stage of growth, environmental conditions were more unfavorable to interplanting beans than the single planting. On the contrary, in the later stage, they were more favor- e to interplanting. Therefore, the yield of individual plants was superior in the inter nting of soybeans. 4) The insect injury (by *Grapholitha glycinivorella*) was less in the erplanting soybeans. It was considered that one of the reasons was due to the differences microclimate. *Subject Headings:* **1. Plant microclimatology 2. Soy bean cultivation.**—*thors' abstract.*

BIOCLIMATOLOGY

See also: **Weather effects on man** (Mücher), 9.11–25; **Tobacco curing, Conn. & Mass.** (Pack), 9.11–94; **Cotton-agroclimatology** (Baldwin), 9.11–95; **Temp. effects on metabolism** (Van Bosveld Heinsius), 9.11–105; **Climate, Milan** (Thams), 9.11–106; **Carbon monoxide poisoning** (Buffault), 9.11–206.

9.11–284 551.586:551.510.4:551.588.7

†Georgii, Hans Walter, **Über die Selbstlüftung von Wohnräumen und ihre Bedeutung Bioklimatologie und Hygiene.** [Self-aeration of living quarters and its significance for climatology and hygiene.] *Zeitschrift für Angewandte Bäder- und Klimaheilkunde*, Stutt- t, 1(3):226–234, **1954.** 4 figs., 18 refs.—The question of air exchange between living arters and the surrounding free air through joints of doors and windows and pores and ures in walls is discussed in the light of theoretical considerations of M. V. Pettenkofer, Hottinger, P. Courvoiser, H. Wolpert and others, and on the basis of the author's rsonal investigations aimed at the determination of the magnitude of the air exchange and dependence of wind speed and difference of temperature between room and free air (spraying carbon dioxide and artificial aerosols of $3–5\times10^{-6}$ cm radius in the air of the experimental om). It has been found that in upper floors of houses the influence of wind is predominant— ere is a functional relationship between the volume of exchanged air and the quadrant of nd speed. Mean difference between in- and out-side temperature is the determining factor the cellar; there is a linear relationship between temperature and volume of air exchanged. e second part of the paper discusses the importance of "self-aeration." It not only purifies indoor air, but also diminishes the vapor pressure and reduces the humidity. Graphs d curves showing self-aeration of a room independent of wind speed, the "aeration coeffi- nt" in dependence on the temperature difference with outdoor temperature and the yearly riation of "self-aeration" are included. *Subject Heading:* **1. Ventilation of rooms.**—*A.M.P.*

9.11–285 551.586:612

Vesely, E., **Die Abkühlung im Wasser.** [Cooling off in water.] *Wetter und Leben*, enna, 8(1/2):34–36, **1956.** 5 refs. **DLC**—On the basis of calculations with the kata- rmometer, formulas for determining cooling power in still air and in still water and an

empirical formula relating cooling of the skin and surrounding water temperatures, the au argues for the impossibility of determining the cooling of the skin on the basis of the coo of a katathermometer in water. *Subject Headings:* **1. Cooling power measurements 2. Coo power formulas.**—*I.L.D.*

9.11–286 551.586:6

Vild, D. J. (*ASHAE Res. Lab., Cleveland*); Erickson, M. L. (*Minnesota Univ.*); Parme G. V. and Cerny, A. N. (*both ASHAE Res. Lab.*), **Periodic heat flow through flat roofs.** *Am can Society of Heating and Air-Conditioning Engineers, Transactions*, 61:396–412, pub. 19 3 figs., 3 tables, 6 refs., eqs. **DWB** (P A512sw)—Results of tests with a solar calorim under natural weather conditions in July and Aug. 1953 are presented in detail and discus Work was done at the ASHAE Research Lab. at Cleveland, Ohio. Equipment and meth are described. *Subject Headings:* **1. Heat flow through flat roofs 2. Solar calorimeters.**—*M*

9.11–287 551.586:697.9(7

*Thom, E. C. (*U. S. W. B., Wash., D. C.*), **Climate and air conditioning.** *U. S. Wea Bureau, Weekly Weather and Crop Bulletin*, 43(30):7–8, July 23, **1956.** 2 figs., table. **DV DLC, DA**—The "effective temperature" concept was developed by the American Societ Heating and Air Conditioning Engineers. It provides a measure of the amount of hun discomfort from various dry bulb and wet bulb temperatures combined. Mean value discomfort for Baltimore, observed at the Friendship International Airport in 1950–1 are presented in a table and two charts—highest (80%) was from noon–5 p.m. in July. *Sub Headings:* **1. Comfort climates 2. Effective temperatures 3. Air conditioning 4. Baltim Md.**—*N.N.*

UPPER AIR CLIMATOLOGY

See: **Upper air winds & temp., Antarctica** (Hofmeyr), 9.11–48.

ENVIRONMENTAL INFLUENCES

See also: **Fog classification & forecasting** (Gal'tsov), 9.11–19; **Forest effects on evap.** (Lowry), 9.11–111; **Orographic influences on momentum transport** (Wippermann), 9.11–184; **Topographic effects on typhoons** (Takenaga, Yamaguchi), 9.11–199; **Urban climates** (Vinaccia), 9.11–280; **Ventilation of rooms** (Georgii), 9.11–284.

9.11–288 551.588.1:551.5

†Johansen, Harald, **On continental and oceanic influences on the atmosphere.** *Mete logiske Annaler*, Oslo, 4(8):143–158, **1958.** 8 figs., 21 refs. **DLC**—The annual variation of relative 700-1000 mb and 500–700 mb topography on the Northern Hemisphere has b compared with the variation in blocking activity. It has been shown that the explanatio the seasonal frequency of block occurrence must be looked for in the differential heating of air along the western part of the continents and eastern part of the oceans during spri *Subject Headings:* **1. Continentality 2. Oceanic influences 3. Blocking action 4. Relat topography.**—*Author's abstract.*

SYNOPTIC CLIMATOLOGY

9.11–289 551.589.5:656.7(

*Yamada, N. and Sakai, S., **On the flying weather condition at the selected stations Japan.** *Journal of Meteorological Research*, Tokyo, 10(1):47–52, **1958.** 10 figs., 4 tables refs. In Japanese; English summary p. 47. **DWB, DLC**—A statistical study of fly weather conditions at selected stations (including 8 main aerodromes) in Japan is made, ba on the data of 3 years (1951–1953). Monthly and hourly variations of specified flying weat condition are given in the form of tables and figures. It is found that the main factors affect the flying weather conditions over Japan are the poor visibility and low ceiling due to sea during the warm season around Hokkaido and the east coast of Sanriku, the low ceiling d to Bai-u over the whole of Japan, the restricted visibility due to haze and smoke through

ear (especially during cold season) at several stations around big cities and the poor visi- y due to monsoon snow during cold season along the coast of the Japan Sea. *Subject dings:* **1. Flying weather 2. Ceiling and visibility data 3. Japan.**—*Authors' abstract.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Solar effects on weather & man** (Berg), 9.11–12; **Solar flare effects on iono- sphere,** 9.11–164; **Solar spectrum** (Thomas), 9.11–202; **Turbulence at the meteoric level** (Booker), 9.11–217.

9.11–290 551.590.25:523.5:535.35

Halliday, Ian (*Dominion Obs., Ottawa, Ontario*), **Meteor wakes and their spectra.** *Astro- sical Journal*, Chicago, 127(2):245–252, March **1958.** 2 figs., table, 19 refs. **DWB, DLC**— e seven known photographic spectra of meteor wakes are reviewed. Very low levels of itation predominate. The strong lines of neutral magnesium are possibly present in meteor- ce spectra but are probably absent in high-speed pellet spectra. From the intensities and ctral excitation of wakes it is concluded that they are produced by particles of atomic size her than by ablation from solid fragments. The excitation mechanism is believed to be mic collisions. *Subject Headings:* **1. Meteor train spectra 2. Excitation mechanisms.**— *thor's abstract.*

9.11–291 551.590.25:621.396.9

Keary, T. J. and Wirth, H. J. (*both, U. S. Navy Electronics Lab., San Diego, Calif.*), **The dom occurrence of meteors in the upper atmosphere.** *Journal of Geophysical Research*, .sh., D. C., 63(1):67–75, March **1958.** 6 figs., table, 5 refs., 7 eqs. **DLC**—This paper orts an experimental study of the distribution of time intervals between bursts of 43.5-Mc/s nals received over a 690 km path from Stanford, Calif., to San Diego, Calif., with the object determining whether or not the bursts occurred completely at random. The distribution time intervals observed is consistent with the distribution expected if the bursts are produced scattered radiation from the ionized trails of meteors which enter the upper atmosphere random. The number of time intervals observed less than one second is appreciably less n the number calculated. This would be the case if some bursts were not observed when interval between bursts is comparable to the duration of the bursts. The difference ween observed and calculated values for large intervals for which the actual number of servations is small is not statistically significant. The observed number of triplets of ally spaced bursts substantially agrees with the number expected if the bursts occurred at ndom. The data used in this analysis were the intervals preceding 778 bursts observed ring 0400–0600 h on Aug. 3, 1956 and those preceding 446 bursts observed during 0500–0700 h Nov. 6, 1956. *Subject Headings:* **1. Meteor echoes 2. Random meteor echoes 3. Cali- nia.**—*Authors' abstract.*

9.11–292 551.590.25

Lovell, A. C. B. (*Jodrell Bank Exp. Sta., Univ. Manchester*), **Meteors.** (In: Bates, D. R., *l.*), **The earth and its atmosphere.** N. Y., Basic Books, **1957.** p. 256–272. 5 figs., 2 oles.) **DLC**—Shooting stars, visual and photographic methods of meteor investigation, dio methods, origin of meteors, shower meteors, sporadic meteors, evaporation of meteors, thods of measuring physical properties of the upper atmosphere by meteor study, numbers d masses of meteors, meteorites and their composition, large meteors and craters, origin of teorites, micrometeorites and the zodiacal light are discussed for popular consumption, th several good schematic diagrams. *Subject Heading:* **1. Meteors.**—*M.R.*

VISIBILITY

9.11–293 551.501:551.591(26)

Williams, C. H., **Hints on observing, No. 4, Judging visibility.** *Marine Observer*, 24(164): 3–106, April **1954. DWB**—Hints on estimating visibility code numbers 90–99 at sea,

including checking by radar. *Subject Headings:* **1. Visibility measurement 2. Ma observing.**—*C.E.P.B.*

OPTICAL PHENOMENA

9.11–294 551.593.53:5

Volz, F., **Beobachtungen über das blaue Luftlicht und die Sichtfarben.** [Observa on the blue color of the atmosphere and the visible colors.] *Frankfurt a.M. Univers Meteorologisch-Geophysikalisches Institut, Bericht,* No. 6:73–77, **1956.** 2 figs., table, 9 **DWB**—Although the objective acquisition of a blue color by dark objects through the l of the atmosphere is stronger the closer the target, the effect for the eye is greatest at mode distances since the brightness difference between horizon and target should not be too la The "bluing" is greater depending on the wave length attenuation and scattering of light aerosol; it will be more marked in clean air than in the presence of haze and even fog. Acc ing to computations, as the blue color [expressed by diminishing λ_F (color coordinates) increasing saturation] increases, the greater is α', the wave length exponent of the extinc coefficient. The manner in which the subjective color saturation of the eye changes is vestigated by examining the "bluing" within the currently measured values of α or α_D. dence is presented indicating that photometrically determined blue light of the atmosp does not correspond to subjectively perceived blue coloration by the eye. Also, data presented confirming calculations of MIDDLETON and MÖLLER that in the case of target tances about $\frac{1}{5}$ greater than the normal visual distance, targets of moderate intrinsic bright and color are scarcely distinguishable from black targets in tone saturation and bright under the influence of atmospheric light. *Subject Headings:* **1. Blue light 2. Visual ac** —*I.L.D.*

9.11–295 551.59

Grady, J. (*Weapons Res. Est., Woomera*) and Trefry, G. (*Met. Office, Woomera*), **Hazi along vertical and oblique lines of sight.** *Australian Meteorological Magazine,* Melbou No. 19:36–45, Dec. **1957.** fig., 2 tables, 2 refs., 7 eqs. **DWB, DLC**—A method is descr whereby overall haziness in a vertical direction is measured by recording the elevation which selected stars disappear to the naked eye. *Subject Heading:* **1. Haze measure techniques.**—*Authors' abstract.*

9.11–296 551.593.63:551.51

†Deirmendjian, Diran, **Theory of the solar aureole, Pt. 1, Scattering and radiative trans** *Rand Corporation, Santa Monica, Calif., Project Rand, Research Memorandum, RM-2* Oct. 3, **1957.** 38 p. 5 figs., 26 refs., 36 eqs. **DWB** (507.2 R186r). Also issued in *Ann de Géophysique,* Paris, 13(4):286–306, Oct./Dec. **1957.** 5 figs., 26 refs., 36 eqs. French English summaries p. 286. **DLC.**—This **Research Memorandum** presents part one of a two study of the solar aureole. In this first part, the theory of the clear sky aureole around sun is discussed as a problem of radiative transfer in a plane-parallel, scattering atmosp containing two types of particles: molecules characterized by the symmetrical Rayl scattering and a few larger spherical dielectric particles characterized by a highly asymmetri forward scattering pattern. For a single scattering process of the latter type, the class series solution of G. MIE is replaced by the approximation proposed by D. S. SAXON mak use of an integral representation of the amplitude of the scattered electromagnetic w After verifying the high degree of approximation thus obtained to the exact scattering patt near the forward direction, it is shown how it can be used in the equation of radiative tran for a turbid atmosphere, as formulated by Z. SEKERA, in evaluating the effects of turbidity the theoretical skylight corresponding to a Rayleigh atmosphere. The applications to skylight in the immediate vicinity of the sun will be discussed in Pt. II. *Subject Headi* **1. Halo theories 2. Radiative transfer.**—*Author's abstract.*

9.11–297 551.5

Tanaka, T. and Tsutsumi, K. (*both, Met. Research Inst.*), **Anomalous polarization of light scattered from the atmosphere in 1954.** *Geophysical Magazine,* Tokyo, 27(3):451– Sept. **1956.** 43 figs., numerous tables, 3 refs. **DWB, DLC**—In 1954, some distinct anoma

he polarization of the light scattered from the atmosphere were found. From the positions eaks, and the slopes of different parts of the polarizability curve, the sizes of particles, by h the anomalous polarization was produced, can probably be deduced. It was concluded these anomalies can be explained as due to opaque spheres of diameters of 0.61–1.02μ scattering the light of intensities of $\frac{1}{5}$–$\frac{1}{20}$ in comparison with the normal case, the mean size g 0.75μ. The cases of the spheres with the other physical properties were also discussed. *ject Headings:* **1. Polarization anomalies 2. Scattering of light.**—*Authors' abstract.*

ELECTRICAL PHENOMENA

See also: **Beta ray ionization** (Miranda), 9.11–130; **Ionosphere electron-density measurements** (Jackson et al.), 9.11–166.

9.11–298 551.594:551.501.9

Mühleisen, R., **Vorschläge für die Auswahl, Einrichtung und Zusammenarbeit luftktrischer Stationen im Internationalen Geophysikalischen Jahr.** [Suggestions on the ction, set-up and cooperation of atmospheric electricity stations during the IGY.] (In: üel, H. (*ed.*), **Luftelektrizität im A.G.I.: Bericht über die Tagung in Aachen am 11.–12. i 1956.** pub. Aachen, **1957.** p. 72–79. 4 refs. German and English summaries p. 72.) **B**—For the atmospheric electrical investigations during IGY some proposals for the selecn of the stations, for the measurement methods and for the exchange of the results are made. he results are to be representative and comparable within a large area, the frequent disbances near the ground, effected for example by artificial space charges or produced by ta-effects, must be avoided. *Subject Heading:* **1. IGY atmospheric electricity stations.**—*thor's abstract.*

9.11–299 551.594.1/2:621.319.3

Kulagin, D. I., **Nekotorye rezul'taty izmereniia elektricheskogo polia atmosfery elektricheskim generatorom.** [Some results of measurements of the atmospheric electric field means of an electrostatic generator.] (In: Akademiia Nauk Uzbekskoĭ SSR. Institut tematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashkent, **1955.** p. 291–. 7 figs., ref., eq.) **DLC**—The author describes the theoretical and technical basis of an trostatic generator for measuring the rapidly changing atmospheric electricity fields. e essence of this method is based upon the fact that if a metallic plate connected by a high istance R with the earth is introduced into an electric field with potential E, then electric rges of a density $\sigma = E/4\pi$ are induced upon it or $E = 4\pi Q/S$, where Q—charge appearing a plate having an area S. When the plate is periodically screened an alternating current l flow over R, the magnitude of which is proportional to E. The results of measurements h this electrostatic generator carried out in Tashkent are presented in the form of graphs wing diurnal variations of the electric potential as measured by the electrostatic generator l the Benndorf electrograph and the Wulf electrometer. It is concluded that the recording the electric field by means of collectors and simultaneous observations with electrostatic erators yields sufficiently adequate agreement. The observations made with an electrotic generator are less inertional than the Benndorf registration. A comparison of the method he electrostatic generator, reflecting an actual field variation, with the method of collectors ws that the method of recording with a Benndorf electrograph can adequately reflect field iations in the presence of disturbing meteorological phenomena, if this apparatus is properly up and used. *Subject Headings:* **1. Electrostatic generators 2. Atmospheric electricity asurements.**—*I.L.D.*

9.11–300 551.594.11:551.506.3

*Vinogradov, P. L., **Gradient elektricheskogo potensiala v atmosfere po nabliudeniiam v e za 1943–1940 gg.** [Electrical potential gradient in the atmosphere according to observans at Zue for 1943–1950.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 120):58–69, **1956.** 9 refs., 3 tables, 3 figs. **DLC**—Measurements of electric potential dient were carried out with a Benndorf mechanical electrograph over a period of 8 years at e (some 35 km north of Irkutsk). Graphical and numerical data are presented on the

annual variations of electric potential gradient on quiet days, mean daily variation of pote gradient on quiet days, 8 year daily variations of potential gradient and mean seasonal va tions of the potential gradient. *Subject Headings:* **1. Atmospheric potential gradient meas ments 2. Zue, U.S.S.R.**—*I.L.D.*

9.11–301 551.59

Kraakevik, J. H. (*U. S. Naval Res. Lab., Wash., D. C.*), **The airborne measuremen atmospheric conductivity.** *Journal of Geophysical Research*, Wash., D. C., 63(1):161– March **1958.** 5 figs., 16 refs., 3 eqs. **DLC**—The simultaneous measurement of both p conductivities from a P4Y airplane using two Gerdien-type condensers is described. altitude distribution of conductivity representative of clear Arctic air is presented. F this distribution, a columnar resistance of 6.0×10^{16} ohm-m^2 is obtained by integration f the earth's surface to 6 km. The average ratio of negative to positive conductivity was fo to be 1.1. The charge on the aircraft was found to have negligible effect on the conducti measurement for fair weather conditions. Tribo-electric charging of the conductivity cham central electrodes by aerosols was observed on most fair weather flights. Concurrent obse tions at the earth's surface occasionally exhibited the same effect. Even in its pres techniques were used which permitted valid measurements of conductivity to be made. I suggested that this effect may have been responsible for unusually high positive-to-nega conductivity ratios reported by others. *Subject Headings:* **1. Atmospheric conductivity 2. plane observations.**—*Author's abstract.*

9.11–302 551.594.13 551.57

Kulagin, D. I., **Ob elektricheskom pole atmosfery malooblachnykh sukhikh raion** [Atmospheric electric field in dry regions of low cloudiness.] (In: Akademiia Nauk Uzbeks SSR. Institut Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekistane.** Tashk **1955.** p. 281–290, 10 figs., table, 17 refs., eqs.) **DLC**—The author reviews various stu on the origin of atmospheric electricity, in particular the work of IA. I. Frenkel', E. Chezniavskiĭ, etc. and the values of the electrical conductivity of the atmosphere (λ) a potential gradient (ν') (including diurnal and annual variations) measured at Tashkent o a period of years. In this study the author presents the results of studies carried out Tashkent on the relationship between the electric properties of the atmosphere and aer phases. It was found that, as the dust concentration increases, the electrical conductiv diminishes but the potential gradient increases. The annual variation of ν' and λ and dust c centration shows a uniphasal variation variation in ν' and dust concentration and an oppos variation of dust concentration and λ. There is an inverse relationship between ν' and T (t bidity) and a uniphasal relationship between λ and T in their annual variation. Atmosphe turbidity increased during the afternoon hours in comparison to the morning hours. ν' creased in the morning hours but diminished during the afternoon. It is concluded that one the local factors participating in the formation of the electrical field of the atmosphere duri continuing cloudless weather is the presence of scattering dust layers with predominantly to positive charges. The origin of these layers is described in terms of thermodynamic proces developed in Central Asia and also as a result of advection. Data supporting this hypothesis, well as those showing variations of ν' and λ, are presented. *Subject Headings:* **1. Electrical co ductivity of air 2. Aerosol electrification 3. Dust charges 4. Tashkent, Uzbek, S.S.R.** *I.L.D.*

AURORAS

See also: **Aurora Australis catalogs, New Zealand** (Thomsen et al.), 9.11–27.

9.11–303 539:551.594

Bauer, Ernest and Wu, Ta-You, **Cross sections of dissociative recombination.** *Canad Journal of Physics*, Ottawa, 34(12B):1436–1447, December **1956.** 2 figs., table, 6 refs., 38 e **DWB, DLC**—The following process is considered. A hydrogen molecular ion H_2^+ in ground state, $1s\sigma^2\Sigma g^+$, captures a free electron of low energy and splits up into two hydro atoms in the states $H(1s)+H(2x)$ or $H(1s)+H(2p)$. The cross sections for transitions i these two states are calculated in a "Born approximation" as functions of electron energy

gies less than 1 ev., and are found to be of gas kinetic order of magnitude (10^{-15} cm^2). *ject Heading:* **1. Dissociative recombination.**—*Authors' abstract.*

9.11–304 535.215:551.594.51

Isaacs, L. D.; Price, W. C. and Ridley, R. G. (*all, Univ. of London, King's College, Eng.*), **uum ultra-violet spectra and molecular ionization potentials.** (In: **The threshold of space,** by M. Zelikoff. N. Y., Pergamon Press, **1957.** p. 143–150. fig., 6 tables, 15 refs.) C—The correlation of molecular ionization potentials derived by direct photoionization hods with those deduced from vacuum ultraviolet absorption spectra permits a clear ntification of the types of electron involved and their classification in terms of molecular cture. The variation of the actual values with different substituents gives an indication he effect they have on the normal and ionized state of the basic chromophoric group of the ecule. This is directly related to their chemical and photochemical behavior. Some ecular spectra, in particular those of the halogens and the substituted alkynes, do not ear to agree with a simple interpretation of the photoionization results and it is considered t for the halogens ion pairs are probably formed, while for the substituted alkynes an rnal rearrangement of a highly excited state results in the formation of allene type ions. *ject Heading:* **1. Photoionization of molecules.**—*Authors' abstract.*

9.11–305 313.1:541.1:546.21:551.594.51

Silverman, Sam and Lassettre, E. N., **Electronic collision cross sections for oxygen at itation energies above 10 volts.** Ohio, State Univ. Research Foundation, Contract AF 122)-642, Scientific Report, No. 7, June **1957.** 54 p. figs., tables, 16 refs. **DWB** (M055 sc)—Electronic collision cross sections and generalized differential oscillator strengths have n determined for oxygen throughout the excitation energy range from 10 to 80 ev at an ident kinetic energy of approximately 500 ev. The results obtained are described and cussed. The oscillator sum rule has been tested. Total collision cross sections have been lculated from the data and used in the discussion of the dissociation probability of molecular gen. *Subject Headings:* **1. Oxygen dissociation 2. Collisional frequencies.**—*Authors' tract.*

PART II. RECENT LITERATURE ON TRANSIENT GEOMAGNETIC VARIATIONS

Compiled by: *Mary L. Rice*

INTRODUCTION

This is our second compilation of literature on geomagnetism. The first was publishe October 1958 (*MAB*, Vol. 9, No. 10). These are not systematic bibliographies, but compila of material in our files. In the **Subject Outline** of each bibliography we included the item num of pertinent material previously published in MAB. Thus the two bibliographies provide an i to the current literature on the subject.

Here we are concerned almost exclusively with transient variations of geomagnetic inte which may be classified as those related to solar day (S), those related to lunar day (L), and turbances (D).

The material has been classified according to the Universal Decimal Classification for magnetism (1957 ed.) and arranged alphabetically by author.

A detailed **Subject Outline** and **Geographical Outline** have been provided in order to facil location of specific subjects and areas.

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9K–1 550.385.4

Afanas'eva, V. I. and Kalinin, Iu. D., **Ob odnoĭ osobennosti geograficheskogo raspredeleniia ia magnitnoĭ buri.** [On one peculiar feature in geographical distribution of the field of a magic storm.] *Akademiia Nauk SSSR, Doklady*, 82(3):379–380, Jan. 21, **1952.** 4 eqs. **DLC**—the field of a magnetic storm two parts could be usually distinguished: disturbed daily variations d storm time variations. Analysis of observations made during 1938–1948 at 10 observatories ated between 32° and 70° of geomag. lat. has shown that the secondary maximum of disturbed ly variations is observed between 50°–70° lat., with lowest minimum of absolute value in lat. °–65°. For a theoretical explanation of this phenomenon the authors presented several equations. *bject Headings:* **1. Magnetic storms 2. Disturbed weather variations.**—*N. T. Zikeev.*

9K–2 550.385.2

Ahmed, S. J. (*Geophys. Obs., Quetta, Pakistan*) and Scott, W. E. (*Dept. of Terrestrial Magnetism, rnegie Inst. of Wash.*), **Time relationship of small magnetic disturbances in Arctic and Antarctic.** *urnal of Geophysical Research*, Wash., D. C., 60(2):147–154, June **1955.** figs., 3 tables, 13 refs. **WB**—Magnetograph records for Feb. and March 1934 from Little America and College-Fairbanks laska) were examined for conspicuous disturbance movements with respect to their parallelism time of occurrence. The study, although based on only a few available records, is unique in that e two stations lie in about the same geographical meridian and each is located in respective northern d southern auroral zones. It was found that the time difference between the occurrences at the o stations is often small (a matter of minutes or less). *Subject Headings:* **1. Magnetic disturbances Correlation coefficient 3. Little America 4. College, Alaska.**—*Authors' abstract.*

9K–3 550.385.2:523.74

Ananthakrishnan, R., **Geomagnetic activity and the sunspot cycle.** *Nature*, London, 172(4384): 4–855, Nov. 7, **1953.** 3 refs. **DWB**—Magnetic character figures Cî at Kodaikanal were classified o groups of intensity and calculated for five-yr. periods centered on last 4 sunspot maxima. They

show that the 1937 maximum was the most active and the 1947 least active geomagnetically. is parallelism between frequency of highly disturbed days and prominence activity. *Subject ings:* **1. Magnetic disturbances 2. Sunspot cycle.**—*C.E.P.B.*

9K–4 550.3

Angenheister, G., **Registrierungen erdmagnetischer Pulsationen, Göttingen 1952/53.** [Re of geomagnetic pulsations, Göttingen, 1952/53.] *Beiträge zur Geophysik*, 64(2):108–132, 14 figs., 18 refs. **DWB**—Pulsations are defined as oscillations of the magnetic field vector of sec. The system of recording them is described and the possibility of using resonance rec is discussed. At Göttingen two main groups are found: *a* with period 5–700 sec and a clear max shortly before noon; *b* with an evening maximum. A close correlation is found between pulsa and the code figure K (especially A_k). *Subject Headings:* **1. Geomagnetic pulsations 2. Götti Germany.**—*C.E.P.B.*

9K–5 551.510.535:55

Bartels, Julius (*Geophys. Inst., Göttingen Univ.*), **The contrast between geomagnetic S a at Huancayo.** *Indian Journal of Meteorology and Geophysics*, Delhi, V. 5, Spec. No.: 69–74, **1954.** 7 figs., 5 refs. **DWB**—From a new analysis of S and L for Huancayo, the striking sea change in the amplitude of L is contrasted with the small seasonal change in S. A similar cor occurs in the critical frequency of the ionospheric F_2-layer. *Subject Headings:* **1. Geomag variations 2. Ionospheric variations 3. Huancayo, Peru.**—*Author's abstract.*

9K–6 550.3

Bartels, Julius, **Erdmagnetisch erschliessbare lokale Inhomogenitäten der elektrischen fähigkeit im Untergrund.** [Geomagnetically determinable local anomalies in the electrical ductivity of the earth.] *Akademie der Wissenschaften in Göttingen, Mathematisch-Physika Klasse, Nachrichten, IIa*, No. 5:95–100, **1954.** table, 18 refs. Also: Kertz, Walter, **Modell erdmagnetisch induzierte elektrische Ströme im Untergrund.** [Model of a telluric current ind by geomagnetism.] *Ibid.*, p. 101–110. 4 figs., 5 refs., eqs. **DLC**—Local geomagnetic anom at, say, 100 m depth are difficult to measure but may be inferred from geomagnetic bay-disturb observations in the light of modern theory of geomagnetism and geoelectricity. Examples are g from U. S., Germany and auroral zone. A plan for further research during IGY is proposed. second paper gives the theory and an example worked out for central and northern Europe, sho that at 80 km depth a westward blowing current exists over N. Germany during a bay disturb *Subject Headings:* **1. Geomagnetic anomalies 2. Bay disturbances 3. Northwest Germany.**—*A*

9K–7 550.385.26:52

Bartels, Julius, **Typische tägliche Gänge der erdmagnetischen Feldkomponenten in Pots und ihre Bedeutung.** [Typical daily variations of the terrestrial magnetic field componen Potsdam and their significance.] *Zeitschrift für Meteorologie*, 5(7/8):236–239, July–Aug. **1** fig., 7 refs. **DWB**—Diurnal variation of N,E and vertical components are calculated for L Jan. and June–July for quiet days with sunspot numbers 0 and 128 and disturbed days. There unexpectedly large change of components with increasing spot number, showing that the smalle sunspot number the higher the layer ionized by solar wave radiation. *Subject Headings:* **1. Diu magnetic variations 2. Sunspot effects 3. Potsdam, Germany.**—*C.E.P.B.*

9K–8 550.385:523

Becker, Udo, **Über eine Beziehung zwischen erdmagnetischer Unruhe und der Anordnung Sonnenflecken.** [On a relation between geomagnetic disturbance and the arrangement of sunspo *Zeitschrift für Astrophysik*, 32(3):195–199, **1953.** 4 figs., table, 5 refs. **DLC**—The simultan passage of two spot groups in N. and S. Hemisphere of the sun is followed after 2–3 days by a defi decrease of magnetic disturbance. On magnetically quiet days the mean longitude of sunspots a maximum 40°W of central meridian in both hemispheres. *Subject Headings:* **1. Sunspot eff 2. Magnetic disturbances.**—*C.E.P.B.*

9K–9 550.385:52

Bernard, Pierre, **Isolement de la variation undécennale de la composante horizontale du ch magnétique terrestre par combinaisons linéaires d'ordonnées.** [Isolation of the 11-year varia in the horizontal component of the terrestrial magnetic field by linear combination of ordinat *Annales de Géophysique*, 8(2):248–252, Apr./June **1952.** 5 figs., 2 tables, 3 refs. French English summaries p. 248. **DWB**—The curves of the periodic 11-year variation of H, obtained LABROUSTE's method, are presented and discussed. It is emphasized that they are almost of same amplitude when calculated from the calm days and from all days, a result difficult to exp by the classical post-perturbation effect. *Subject Headings:* **1. Magnetic variations 2. Sun cycles.**—*Author's abstract.*

9K–10 550.385.24:523.74

Bhargava, B. N. and Naqvi, Ali M., **Very long sequences of geomagnetic activity and its annual ...ation.** *Nature*, London, 173(4402):498–499, March 13, **1954.** 2 refs. **DWB**—By plotting ...y running means of magnetic character figures 1950–1953, authors found 2 long sequences of 27-... recurrences beginning July 11–12, 1950 and Nov. 21, 1951, and both continuing at end of 1953. ...y had yearly maxima in March–April, minima in Sept.–Oct. Authors conclude that these ...ences were due to 2 principal long-lived M-regions 130° longitude apart, in heliographic latitude ... 2. *Subject Headings:* **1. Annual magnetic variations 2. Sunspot effects.**—*C.E.P.B.*

9K–11 550.385:551.510.535

Briunelli, B. E., **O vozmozhnoĭ prichine vozmushchennoĭ solnechnosutochnoĭ variatsii zemnogo ...nitnogo polia.** [The possible cause of disturbed daily solar radiation of the earth's magnetic ...l.] *Akademiia Nauk SSSR, Doklady*, 99(5):741–743, Dec. 11, **1954.** fig., 3 refs., 7 eqs. **DLC.** ...ns. into English available as Astia AD-137-538, issued **1957.** 5 p.—It has been found that the ...vidual fluctuations constituting a magnetic storm are produced by a system of currents similar ...p system. A possible mechanism is suggested for the formation of this system of currents which ... in the ionosphere and which form two vortices occurring after midday and after midnight. ...*ject Headings:* **1. Magnetic storms 2. Ionospheric currents.**—*I.L.D.*

9K–12 550.386:551.510.535

Burkhart, K. and Selzer, E., **Analyse de la variation de forme sinusoïdal sur la déclinaison ...gnétique du 11 avril 1954.** [Analysis of the variation of the sinusoidal form on the magnetic ...lination of April 11, 1954.] *Annales de Géophysique*, Paris, 11(3):353–368, July/Sept. **1955.** ...gs., 2 refs. **DLC**—Sinus-like perturbations of the magnetic declination are much less frequent ...n the well known ordinary bays. In common with these they appear during the evening or night ...rs and have, most likely, a corpuscular origin. This paper gives the results of the analysis of a ...iation of this kind which occurred on Nov. 4, 1954 by, otherwise, moderately perturbed conditions. ...e examination, by methods given in publications (1) and (2), of the magnetograms of 14 European ...tions, put into evidence the development of a vortex-type, semi-local perturbation of the iono... ...here, in regions bordering the southern limits of the auroral zone. In this analysis the influence ...possible vertical electric currents participating in the vortex, and the one of induced telluric ...rents, had to be set aside, but these approximations could not affect appreciably, at least in the ...e of the perturbation of Nov. 4, 1954, the fundamental characteristics of our results. This flow ...er Europe of electrical currents in vortex formation presents many similarities with the cyclones ...the troposphere which, in particular, circle equally counter-clockwise. However, these cyclones ...t generally days and weeks, whereas the circular perturbations in the ionosphere are over in a ...ch shorter length of time. *Subject Headings:* **1. Geomagnetic fluctuations 2. Ionospheric ...rms.**—*Authors' abstract.*

9K–13 550.385

Burkhart, Kurt, **Die Magnetflussänderung der Zone von 30°S bis 60°N seit 1900.** [The ...ange of magnetic flux in the zone 30°S. to 60°N. since 1900.] *Zeitschrift für Meteorologie*, 4(3):86–..., March **1950.** fig., 4 refs. **DLC, DWB**—Planimetric summation at 5-yearly intervals shows ...x decreasing till 1938, then increasing. Maximum expected in 1958. *Subject Heading:* **1. Mag...tic field variations.**—*C.E.P.B.*

9K–14 550.385:523.75

Bruzek, A., **Zur Lokalisierung der Bartels'schen M-Gebiete.** [On the localization of the ...rtels M-regions.] *Zeitschrift für Naturforschung, Sec. A*, 7(11):708–711, Nov. **1952.** fig., 15 refs. **...LC**—Recurrent geomagnetic storms of medium strength are due to so-called M-particle radiation. ...e M-region associated with 3 characteristic storms is found to be a coronal region of very low ...tensity in 5303 and 6374Å, in 60° heliographic lat. The center of this region passes the sun's ...eridian about 3 days before center of storm. *Subject Headings:* **1. Magnetic storms 2. Sun's ...rona.**—*C.E.P.B.*

9K–15 550.385

Chakrabarty, S. K. and Pratap, R. (*Geophys. Lab., Bengal Engin. College, Howrah, India*), **...n the dynamo theory of geomagnetic field variations.** *Journal of Geophysical Research*, Wash...gton, D. C., 59(1):1–14, March **1954.** 3 figs., 2 tables, 12 refs. **DLC**—The dynamo theory ...veloped by STEWART, SCHUSTER, and CHAPMAN in order to explain the geomagnetic field variations, ...doubt, gives qualitative explanations for the observed variations but differs appreciably in details. ...the present paper, the analysis of CHAPMAN has been modified and the dynamo equations have ...en solved without introducing approximations which are difficult to justify. The solution of the ...namo equation has been given in the most general form, which can be used for any given "iono-

spheric conductivity" and "atmospheric oscillations." The results obtained have been com with those of CHAPMAN, which show the effect introduced in the final result by the approxim used by CHAPMAN. The results have been utilized also to calculate the diurnal variations in zontal and vertical intensities, and these have been compared with the observed data. The show that with a reasonable assumption for the conductivity and the atmospheric oscillation dynamo theory can very well explain the observed facts. *Subject Headings:* **1. Geomagneti variations 2. Dynamo theory.**—*Authors' abstract.*

9K–16 550

Chapman, Sydney, **The morphology of geomagnetic storms: an extension of the analy D_s, the disturbance local-time inequality.** *Annali di Geofisica*, 5(4):481–499, Oct. **1952.** 5 5 tables, 5 refs. **DLC.** Also his: **The morphology of magnetic storms.** *International Coun Scientific Unions. Mixed Commission on the Ionosphere, third meeting, Canberra, Australia, 24–26, 1952, Proceedings*, pub. **1953.** p. 84–94. 4 figs., eqs. **DWB**—A table of 40 mo magnetic storms (1902–1911) is presented, giving date and hour of beginning, character fi and numbers showing the time of the disturbance in relation to 27-day sequences. These da analyzed in detail, especially in respect to variations of D_s and D_{st} (field depending on storm- It is found that D_s "varies with storm time in a manner materially different from D_{st}, deve more rapidly than the main phase of D_{st} and decaying much faster." *Subject Headings:* **1. Ma storms 2. Geomagnetic disturbances 3. Geomagnetic data.**—*G.T.*

9K–17 550.3

Chapman, Sydney (*Geoph. Inst., College, Alaska*), **Notes on the theory of magnetic st** *Indian Journal of Meteorology and Geophysics*, Delhi, V. 5, Spec. No.: 33–40, Dec. **1954.** **DWB**—A non-mathematical account is given of the model problems and their solutions, by CHAPMAN and FERRARO have sought to illustrate some aspects of the theory of magnetic st These problems are here used to develop a qualitative solution of the motion of an infinite n ionized plane sheet of gas (or of a succession of such sheets) towards a unidirectional magneti whose intensity decreases as an inverse power of the distance from an axis to which the sh parallel. The gas in the centre approaches to a minimum distance from the axis and then re again. The gas far to either side moves onward with little distortion. Between these centra outer parts there are two strips of the sheet whose ions and electrons separate from each under the influence of the magnetic field; partly because these strips become much extende reduced to low density. Some charges are deviated away to infinity, others are captured b field and build up a "westward" electric current to which is ascribed the main phase of mag storm. *Subject Headings:* **1. Magnetic storm theories 2. Chapman-Ferraro theory.**—*Au abstract.*

9K–18 550.385.4:

Chapman, Sydney (*Advisory Scientific Director of the Geophys. Inst.*), **A study on the morpho of magnetic storms: geomagnetic time.** Alaska. Univ. Geophysical Institute, AF 19(604)- Scientific Report No. 2, Sept. 1 to Nov. 30, **1955.** 15 p. 3 figs., 2 tables, 3 refs., 13 eqs.— relation between mean (or apparent) geomagnetic time and mean (or apparent) local time is s analytically. A convenient graphical method of determining the difference between the two systems to 0.1 minute is given. (For additional reports, *see* 9K–19, –93, and –94.) *Subject Hea* **1. Geomagnetic time.**—*Author's abstract.*

9K–19 550.

Chapman, Sydney and Sugiura, Masahisa, **A study on the morphology of magnetic storms lengths along the lines of force of a magnetic dipole.** Univ. of Alaska. Geophysical Insti Contract AF 19(604)-1048, Scientific Report No. 3, May 23, **1956.** 3 p. table.—Formulas tables for the arc-length along the lines of force of a magnetic dipole are given with reference t earth treated as a sphere. These tables may prove useful in connection with the study of whistlers and of the motion of charged particles along the lines of geomagnetic force. (For tional reports, *see* 9K–93 and –94.) *Subject Heading:* **1. Magnetic storms.**—*Authors' abstract.*

9K–20 550.385.4:5

Chatterjee, J. S. (*Jadavpur Univ., Jadavpur, Calcutta*), **Induction in the core by magnetic st and earth's magnetism.** *Science and Culture*, Calcutta, 21(10):623–624, April **1956.** 5 refs. **D** Quantitative calculations of the energy gains from magnetic storms which, according to the au more than compensate for losses so that the measured currents in the earth's fluid core are maint by induced currents from the magnetic storms which occur at intervals of about 27 days. P ability of crust does not short circuit the induced currents, since the crust is magnetized to satura *Subject Headings:* **1. Magnetic storms 2. Currents in earth's core.**—*M.R.*

9K–21 550.385:523.74:523.746

Chernosky, Edwin J., **The variation of the geomagnetic-activity recurrence interval with the ... cycle.** *American Geophysical Union, Transactions*, 32(6):861–865, Dec. **1951.** 2 figs., 2 tables, ...efs. **DWB**—A CHREE-method analysis of recurrences of geomagnetic activity was made with ...mbination of variables heretofore unreported, using data for the years 1932–46. The results ...ate that the prevailing interval between geomagnetic disturbances decreases from 28½ days ...e start of a sunspot cycle to 26¾ at the end, a greater variation than the 3% previously reported. ... recurrence tendency for geomagnetic activity was found to be a minimum at sunspot maximum. ... ke other analyses, this one makes use of a large range of C values in the disturbed- and in the ...t-day categories, and it breaks the sunspot cycle into groups consisting of two and three yrs. ...ect Headings: **1. Solar rotation 2. Geomagnetic activity 3. Sunspot cycles.**—*Author's abstract.*

9K–22 550.385.4:612

... Cyran, W., **Die bioklimatische Reizwirkung erdmagnetischer Störungen.** [The bioclimatic ...ulus of terrestrial magnetic disturbances.] *Annalen der Meteorologie, Medizin-meteorologische ...e*, No. 5:89, **1951. DWB, DLC**—Stimulating effect of magnetic disturbances is not recognizable ... character figures 1–5; above that it increases with increase of disturbance. *Subject Headings:* ...agnetic storms **2. Physiology.**—*C.E.P.B.*

9K–23 550.385:523.74

... Denisse, Jean Francois, **Les centres solaires d'activité radioélectrique et leur influence sur ...ivité géomagnétique.** [Solar centers of radioelectric activity and their influence on geomagnetic ...vity.] *Ciel et Terre*, 69(3/4):53–67, March/April **1953.** 6 figs., table, 15 refs. **DWB, DLC**— ... or centers of solar activity are classified into groups A (radio-emissive centers) and B (non-...ssive). From data obtained in continuous measurements of solar radioelectric activity on ... Mc at the Laboratoire des Études de la Marine à Marcoussis (Paris) since 1948, centers of ...up A are selected on the basis of an index accounting for intensity and variability. A correlation ...stablished between solar radioelectric emission and subsequent intensification of geomagnetic ...urbances. It is also shown that solar centers of group B have an attenuating effect on geo-...gnetic activity. The applicability of these results to the prediction of geomagnetic and ionospheric ...urbances is suggested. Correlations between magnetic and solar activity analyzed by other ...iors are discussed. *Subject Headings:* **1. Solar activity 2. Magnetic disturbances 3. Geo-...gnetic activity.**—*G.T.*

9K–24 550.385:523.74

... Denisse, Jean-François, **Relations entre les phénomènes solaires et terrestres.** [Relations ...ween solar and terrestrial phenomena.] *Académie des Sciences, Paris, Comptes Rendus*, 236(19): ...5–1858, May 11, **1953.** 2 figs. **DWB**—In an earlier paper (*see* 6.6–214, June 1955, *MAB*) ... author and his collaborators produced evidence to the effect that sunspots involving strong ...oelectricity are accompanied by an increase of geomagnetic activity, while a decrease of geo-...gnetic activity takes place when sunspots (even if they are large) are electrically inactive. In ...port of this theory, the author now presents two curves based on a more extensive statistical ...erial (1948–1950) than those presented in the previous papers. Details regarding the relative ...e of increasing and decreasing magnetic and electric activity are discussed. *Subject Headings:* ...unspot effects **2. Magnetic disturbances.**—*G.T.*

9K–25 550.385.43

... Dessler, A. J. (*Lockheed Aircraft Corp., Missile Systems Div., Palo Alto, Calif.*), **The propagation ...city of worldwide sudden commencements of magnetic storms.** *Journal of Geophysical Research*, ...sh., D. C., 63(2):405–408, June **1958.** fig., table, 9 refs. **DLC**—The following model is pre-...ted for the propagation of a worldwide sudden commencement of a magnetic storm: A longitudinal ...romagnetic wave will be generated by the impact between a plasma cloud ejected from the sun, ... the earth's magnetic field. This wave will travel from the point of impact both east and west ...und the geomagnetic equator and carry the magnetic effect of the impact to the back side of the ...h. It is shown that this hydromagnetic wave will be stable at an altitude of about 400 km ... travel with a velocity of about 130 km/sec. Thus, it is proposed that sudden commencements ...not occur simultaneously over the earth. Rather, about two minutes are required for a sudden ...mmencement to be propagated around the world. *Subject Headings:* **1. Sudden commencements ...Propagation velocity of sudden commencements.**—*Author's abstract.*

9K–26 550.385.24:523.78

... Egedal, J. and Ambolt, M., **The effect on geomagnetism of the solar eclipse of June 30, 1954.** ...*nal of Atmospheric and Terrestrial Physics*, 7(1/2):40–48, Aug. **1955.** 4 figs., 4 tables, 8 refs. ...o their: **The effect on geomagnetism of the solar eclipse of June 30, 1954 (supplementary com-**

munication). *Ibid.*, 8(1–2):105–107, Feb. **1956.** 2 tables, 2 refs. **DWB**—In the first observations of declination, horizontal and vertical force at 14 observatories near the track eclipse were examined and it is shown that the maximum deviation nearly coincided with the mum obscuration, showing that soon after the eclipse the sun can compensate the recombi and even increase the ionization of the E layer. The effect is to decrease the departure diurnal variation by an amount of the order of that computed by CHAPMAN. Soon after th paper was prepared, magnetograms were received from 5 places in East Europe. The second contains an examination of these, which agrees with previous results. *Subject Headings:* **1. D geomagnetic variations 2. Eclipse effects on geomagnetism.**—*C.E.P.B.*

9K–27 550.385:5

Egedal, J. (*Danish Met. Inst., Copenhagen*), **On the effect on geomagnetism of solar ecl** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G Brown. London, Pergamon, **1956.** p. 228–235. 2 figs., 2 tables, 9 refs.) **DWB**—While e observations of the effect on geomagnetism of solar eclipses have given more or less doubtful re some recent observations seem to be more promising. L. A. BAUER in an early paper outli theory of the phenomenon, and S. CHAPMAN in 1933 worked out a theory, according to whic effect manifests itself as a diminution of the departure of the daily variation. The max magnetic effect occurs simultaneously with maximum obscuration, and the diminution of th parture of the daily variation is of the order given by the theory. The necessary internation operation in this work has already been started. *Subject Headings:* **1. Eclipse effects on geoma ism 2. Diurnal geomagnetic variations.**—*Author's abstract.*

9K–28 55

Fanselau, G., **Über die sogenannten zweiten erdmagnetischen Kennziffern.** [On the so- second geomagnetic character figures.] *Zeitschrift für Meteorologie*, 3(8/9):236–240, Aug.–Sept. 4 figs., 7 tables. **DWB**—Author describes a variant of BARTELS' second character figures. turbances are classified into (*a*) elementary waves; (*b*) clear "Bay" disturbances; (*c*) typi disturbances; (*d*) general waviness. Each of these is given an intensity figure 0–3, over a period. Thus 3032 (June 5, 1949, 15–18 h.) means: elementary waves, intensity 3; no "B Z-disturbance intensity 3; general waviness, intensity 2. Subjective but useful for compa with geo-electric phenomena. Tables given Feb.–June 1949. *Subject Headings:* **1. Terre magnetism 2. Magnetic character figures.**—*C.E.P.B.*

9K–29 550.385.24

Felitsyn, F. N. (*Pulkovo Obs.*), **Protuberantsy i geomagnitnaia aktivnost'.** [Prominence geomagnetic activity.] *Astronomicheskii Zhurnal*, Moscow, 17(6):21–25, **1940.** 2 figs., 2 t 6 refs. English summary p. 25. **DLC** (QB1.A47). Trans. into English by E. R. Hope. I as *Canada. Defence Research Board, Translation*, T 195 R, March 5, **1956.** **DWB** (538.7 F31 Data presented to show that the spring and fall maximum of geomagnetic activity are due t changing distance from the areas of solar activity, and the differences in heights from spring t are due to excess of solar activity in the corresponding hemisphere. It is also noted that geomag activity is more closely related to number of prominences and their latitude than to any other of solar activity. Finally, it is stated that coronal formations are probably associated wit beams of solar active radiation. *Subject Headings:* **1. Solar prominences 2. Seasonal geomag variations 3. Translations.**—*From author's abstract, M.R.*

9K–30 551.594.5:550.

Ferraro, V. C. A. (*Queen Mary College, Univ. of London*), **Aurorae and magnetic storms.** Bates, D. R., (ed.), **The earth and its atmosphere.** N. Y., Basic Books, **1957.** p. 231–255 figs.) **DLC**—The history of discovery of the relation between magnetic storms and the au variations of the geomagnetic field, storm time variations, daily variations, form and color of au height, the sunlit aurora, geographic distribution, diurnal variation, auroral spectrum, solar rela 27-day recurrence, neutral ionized streams, theories of geomagnetic storms and auroras (BIRKE STORMER, CHAPMAN-FERRARO, MARTYN, ALFVÉN, BENNET and HULBURT, and the atmos theory of OLIVER WULF, VESTINE and others) are treated in popular style with schematic diag and photos. *Subject Headings:* **1. Auroras 2. Magnetic storms 3. Aurora-magnetic relation** —*M.R.*

9K–31 550.3

Ferraro, V. C. A. (*University College, Exeter, Eng.*), **On the theory of the first phase of a magnetic storm: a new illustrative calculation based on an idealized (plane not cylindrical) n field distribution.** *Journal of Geophysical Research*, 57(1):15–49, March **1952.** 6 figs., 10 159 eqs. **DLC**—The theoretical motion of a semi-infinite neutral ionized stream in a unidirect

netic field of increasing intensity parallel to the stream surface is considered in great detail. ions and electrons in the stream are assumed to be devoid of random motion so that the stream face remains plane throughout the motion. It is shown that the particles in the stream overtake e immediately in front so that the stream surface is constantly reformed by new particles arriving h the main body of the stream. The stream is thus able to penetrate further into the field than ld be the case if they were alone in the field. The retardation of the stream surface is calculated it is shown that the rate at which the velocity of this surface decreases compares well with the ulations made by S. CHAPMAN and the writer in 1931. It is shown that the front surface of the am is eventually brought to rest. The difficulties envisaged by S. CHAPMAN and the writer arding the electrical conductivity of the stream are shown to be illusory, as had already been cluded by the authors. The sudden increase in the horizontal force, H, above the mean over a od of about 2 min is here identified with a sudden commencement (SC) of a geomagnetic storm. e curve illustrating the rise in H shows considerable similarity to the curves of SCs derived on uick-run" magnetic records. *Subject Headings:* **1. Magnetic storm theories 2. Sudden commencements.**—*Author's abstract.*

9K–32 550.385.43

Ferraro, V. C. A. and Unthank, H. W. (*Exeter, England*), **Sudden commencements and sudden pulses in geomagnetism: their diurnal variation in amplitude.** *Geofisica Pura e Applicata*, 27–30, July/Dec. **1951.** 3 figs., 2 refs. **DLC**—Following the examination of the frequencies *S. Cs.* and *S. Is.* given in a recent paper, the diurnal variation of the H-amplitudes at the six tions—Cheltenham, Tucson, San Juan, Honolulu, Huancayo and Watheroo—during the period 6–46 is investigated, and in this *C. Cs.* and *S. Is.* do not appear to differ greatly in their behavior. cept on the case of Huancayo, the greatest amplitudes occur near 0 h local time, after which there fall to the lowest values about 7 h. The *S. Is.* amplitudes may have a secondary minimum near h but this is not certain. *Subject Headings:* **1. Sudden commencements 2. Magnetic storms.** *Author's abstract.*

9K–33 550.385.43

Forbush, S. E. and Vestine, E. H. (*both, Carnegie Inst. of Wash., Wash., D. C.*), **Daytime enhancement of size of sudden commencements and initial phase of magnetic storms at Huancayo.** *Journal Geophysical Research*, Wash., D. C., 60(3):299–316, Sept. **1955.** 11 figs., table, 12 refs. **DLC**—plying statistical tests to 428 SC's, the frequency of occurrence is found to be independent of ne of day. Statistical tests indicate that the average sizes of SC's and of IP are both significantly ater during the daylight hours at Huancayo. Also from 102 SC's occurring between 08^h and 14^h ° WMT at Huancayo, we find that the average size of SC's is greater for those days with the ger diurnal variation (S_q) in H. This result is not only statistically significant but also the average e of SC's was about 50% greater for the group of days with 50% greater diurnal variation in H. e diurnal variation of SC's averaged on 75° WMT for San Juan and Honolulu is practically gligible. The augmentation of SC sizes at Huancayo with S_q in H at Huancayo was found to be e same, whether the average size of the same SC's at San Juan and Honolulu was large or small. significant diurnal variation was found in the frequency of occurrence of SC's observed both at ancayo and Watheroo. A simple explanation is offered for the diurnal variation in the frequency SC's found by Newton from Greenwich results. The relation of daytime enhancement of the e of SC's to S_q in H at Huancayo indicates that the current system responsible is closely associated h the electrojet effect responsible for the large diurnal variation in H at Huancayo. The effects nd are not predicted on the basis of the Chapman-Ferraro theory of magnetic storms in its present m. One possibility being examined is that the electric currents in the atmosphere near Huancayo driven by electrojets of polar regions. *Subject Headings:* **1. Sudden commencements 2. Magtic storms 3. Huancayo, Peru.**—*Authors' abstract.*

9K–34 550.385

Frøshaug, John. **Mean results of geomagnetic observations in Tromsö, Norway, for the years 30–50.** *Journal of Geophysical Research*, Wash., D. C., 61(3):435–444, Sept. **1956.** 9 figs., ables. · **DLC**—Graphs showing variations in the earth's magnetic field over short and long timeervals and analyses of the field are presented for Tromsö, Norway, years 1930–50. *Subject adings:* **1. Geomagnetic variations 2. Tromsö, Norway.**—*Author's abstract.*

9K–35 550.385.43:551.510.535

Fukushima, Naoshi (*Geophys. Inst., Tokyo Univ.*), **Constitution of polar magnetic storms, 2.** *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere Research in pan*, 6(4):185–193, Dec. **1952.** 10 figs., 7 refs., 6 eqs. **DWB**—Geomagnetic variations appearing world-wide magnetic data for May 1 and 2, 1933 are analyzed. The form of these variations ıveys corroboration of the author's theory that the disturbance field of polar magnetic storms

can be identified as a series of intermittent or successive elementary disturbances originating
the auroral zone as a result of the occasional concentration of extraterrestrial corpuscular inva
For Pt. 1 by T. Nagata and N. Fukushima, *see Ibid.*, 6(1):85–98, **1952.** *Subject Headings:* **1.**
netic storms 2. Auroral zone.—*G.T.*

9K–36 550.3

Fukushima, Naoshi (*Geophys. Inst., Tokyo Univ.*), **Geomagnetic variation during the i**
phase of the magnetic storm on Jan. 24, 1949. *Japan. Science Council. Ionospheric Res*
Committee, Report of Ionosphere in Japan, 5(4):191–195, **1951.** 4 figs. **DWB**—A short study
copies of the magnetic components and current arrow maps for Jan. 24, 1949 and July 26,
Subject Headings: **1. Magnetic storms 2. Geomagnetic disturbances.**—*A.A.*

9K–37 550.3

†Fukushima, Naoshi, **Polar magnetic storms and geomagnetic bays.** *Tokyo Univ. Fa*
of Science, Journal, Sec. II, 8(5):293–412, March 30, **1953.** figs., tables, eqs., 117 refs.
issued as: *Tokyo Univ. Geophysical Institute, Geophysical Notes*, 6(1), Contribution No. 14,
1953. DLC—In this extensive review of progress in research on geomagnetic disturbances, re
obtained by various authors are discussed and illustrated. The study is divided into chapte
(1) early results, (2) progressive change in the average current system of bays, (3) dynamic th
of S_D field and bay disturbance, (4) development and decay processes of individual geomag
bays, (5) constitution of polar magnetic storms, (6) relation between S_D field and D_{st} field i
middle and low latitudes, (7) geomagnetic variations and the ionosphere and (8) conclusions.
Appendix, *see* 6.8–142, Aug. 1955, *MAB.*) *Subject Headings:* **1. Geomagnetic disturbance rese**
2. Polar magnetic storms 3. Bay disturbances.—*G.T.*

9K–38 550.385.43:551.510.535

Fukushima, Naoshi (*Geoph. Inst., Tokyo Univ.*), **Some characteristics of magnetic storms, I**
Magnetic storm on August 3, 1949. *Japan. Science Council, Ionosphere Research Comm*
Report of Ionosphere Research in Japan, 5(2):85–98, **1951.** 12 figs., 4 refs. **DWB**—This
history of a magnetic storm was compiled from world-wide data. Development of the storm
related phenomena is represented on graphs and charts showing horizontal current systems,
period oscillations, etc. Author draws some preliminary conclusions including the assumptio
an invasion of some corpuscular stream into the ionosphere during the initial phase of the st
Subject Headings: **1. Magnetic storms 2. Ionospheric research 3. Japan.**—*G.T.*

9K–39 550.385.37

Gibault, Gaston, **Nouvelles observations de pulsations très rapides lors d'un orage magnét**
[New observations of very rapid pulsations during a magnetic storm.] *Académie des Scie*
Paris, Comptes Rendus, 233(25):1655–1656, Dec. 19, **1951.** ref. **DWB**—A case of an unu
magnetic pulsation recorded on Sept. 21, 1951 between 8:54 and 9:01 (prior to the strong mag
storm of Sept. 25–26) is presented. Such pulsations have only been noticed twice before (1938
1946), and cannot be attributed to thunderstorms as the sky was clear all over that part of Fr
in every case. Origin must be connected with magnetic storms. *Subject Headings:* **1. Mag**
pulsations 2. France.—*M.R.*

9K–40 550.38

Gibault, G., **Sur un décalage entre les micropulsations du magnétisme terrestre et les**
turbations ordinaires. [On the lag between micropulsations of terrestrial magnetism and ordi
perturbations.] *Annales de Géophysique*, 10(1):65, Jan./March **1954.** 4 figs. **DLC**—The
Oct. 14 and 15, 1953 were characterized by several chromospheric eruptions. On Oct. 14 there
a magnetic calm both in respect to ordinary magnetic activity and to micropulsations. On Oc
a magnetic storm with sudden commencement set in at 08.45 and the micropulsations resume
08.55 h. Similar evidence of a time lag between the two types of magnetic activity had beer
tained before but this case gives a clearer picture of the phenomenon than any previous one. Rec
are presented (Chambon-la-Forêt). *Subject Headings:* **1. Magnetic disturbances 2. Sudden c**
mencements.—*G.T.*

9K–41 550.3

Gibault, Gaston (*Chambon-la-Forêt Observatory*), **Variations rapides du champ magnét**
terrestre. [Rapid variations of the terrestrial magnetic field.] *Annales de Géophysique*, 8(2):
259, Apr./June **1952.** 2 figs., 5 refs. **DWB**—Note on measurements made with a nonper
variometer recently constructed by the author and installed at the magnetic observatory at Cham
la-Forêt. The instrument is described briefly. In measuring the horizontal component of
terrestrial magnetic field it was found that the amplitude of variations is usually larger and

ation shorter during daytime than at night. Oscillations can first be observed at 2 a.m. at the iest and more frequently between 4 and 5 a.m.; they decrease at about 3 p.m. and rarely subsist r 6 p.m., never after 10 p.m. Portions of recordings are reproduced. *Subject Headings:* **1. Di-nal magnetic variations 2. Chambon-la-Forêt, France.**—*G.T.*

9K–42 550.385:523.7

Gleissberg, W., **Die erdmagnetische Wirkung der nördlichen und der südlichen Sonnenhalb-el.** [The geomagnetic effect of the northern and the southern solar hemisphere.] *Naturwissen-aften*, 44(6):176–177, March 15, **1957.** 2 tables, 4 refs. **DWB**—Geomagnetic disturbances are e frequent when earth is more than 5° from sun's equator, but N. and S. solar hemispheres er in their effects. The difference N–S went through a cycle from 1889–1943. *Subject Headings:* **Geomagnetic disturbances 2. Solar-magnetic relationships.**—*C.E.P.B.*

9K–43 550.385.26

*Griffith, B. A.; Jacobs, J. A. and Sachs, B., **Frequency studies of the hourly mean values of the gnitude F of the earth's magnetic field at Agincourt during 1946–1951.** Toronto. Univ. Dept. hysics, Contract AF 19(604)-761, Scientific Report, No. 1, Aug. 1, **1955.** 16 p. and appendices. gs., 22 tables, eqs.—Hourly mean values of the magnitude F of the earth's magnetic field at ncourt have been calculated from corresponding mean values of the horizontal and vertical nponents H and Z. The data used are those for the period 1946 to 1951, inclusive, a period which gins soon after a sun-spot minimum and extends past a sun-spot maximum. The data for F ve been used to construct frequency distributions for each hour of the day for each of the six rs considered. The resulting distributions have been studied in some detail and the main results this examination are presented in this report. Trend lines for the hourly mean values of F have o been plotted and the number of large departures of F from these trend lines are summarized and cussed. *Subject Headings:* **1. Geomagnetic variations 2. Diurnal geomagnetic variations.**—*uthors' abstract.*

9K–44 550.385.4

Herrinck, P. (*Service Mété. du Congo Belge*), **Sur les perturbations du champ magnétique ter-stre considérées comme variations de relaxation.** [Disturbances of the geomagnetic field con-ered as variations of relaxation.] *Annales de Géophysique*, Paris, 13(3):211–221, **1957.** 7 figs., ble, 4 refs., eqs. English summary p. 211. **DLC**—The records of the horizontal magnetic com-nent, at Elisabethville and elsewhere, show relaxation processes analogous to post-perturbations magnetic storms, and including them, but much more frequent, and subject to a 27 day recurrence ndency. *Subject Headings:* **1. Magnetic disturbances 2. Relaxation effects.**—*Author's abstract.*

9K–45 550.385

Holmberg, E. R. R., **Rapid periodic fluctuations of the geomagnetic field I.** *Royal Astronomical ciety, London, Monthly Notices, Geophysical Supplement*, 6(8):467–481, Oct. **1953.** 9 figs., tables, 13 refs. **DWB**—In this part, Eskdalemuir geomagnetic records are found to show two stinct types of disturbance: a continuous flux of quasi-periodic fluctuations during daylight, ainly of about 20 sec and 56 (winter) to 78 (summer) sec, and at night a succession of short (5–10 n) trains of damped waves of 30–130 sec. The frequencies, variations and intensities are analyzed. *bject Headings:* **1. Magnetic variations 2. Eskdalemuir, Scotland.**—*C.E.P.B.*

9K–46 550.385:551.506.22

Hulburt, E. O., **Geomagnetic disturbances.** *American Geophysical Union, Geophysical Mono-aph*, No. 1:82–85, **1956.** 2 figs., 7 refs. **DLC**—The facts and theories of geomagnetic storms and e three great overhead currents of geomagnetic disturbance inferred from surface observations e described. The experimental program of magnetic observations during the IGY, designed to termine the location and distribution of the inferred overhead currents, is explained. *Subject eadings:* **1. Geomagnetic disturbances 2. IGY geomagnetic program.**—*Author's abstract.*

9K–47 550.385.43

Ishikawa, G., **On the initial phase of geomagnetic storm.** *Papers in Meteorology and Geophysics*, kyo, 1(2–4):319–336, Dec. **1950.** 10 figs., 3 tables, 13 refs., 7 eqs. **DWB**—180 magnetic storms Kakioka 1924–31 are classified according to magnitude of sudden increase of horizontal intensity . This gives an asymmetric distribution which is transformed into a slightly skew normal curve taking $X = \log H$. Diurnal variation of X shows maxima at 12 and 24 h. A similar analysis applied to 233 world-wide storms and 209 values from other stations, with rather similar results. ey are explained by corpuscular emissions from sunspots with shielding by ionosphere, and the netic energy of an emission is calculated. *Subject Headings:* **1. Magnetic storms 2. Kakioka, pan.**—*C.E.P.B.*

9K–48 550.38

Jackson, W., **World-wide simultaneous magnetic fluctuations and their relation to suc commencements.** *Journal of Atmospheric and Terrestrial Physics*, London, 2(3):160–172, 1 7 figs., table, 7 refs. **DWB**—Simultaneous disturbances at 6 stations, Sitka to Honolulu, are class and illustrated, and traces at different stations compared. It is found that world-wide perturbat similar to sudden commencements and lasting several hours may occur without large disturban This suggests that both types originate outside the earth's atmosphere, and are connected changes in conductivity of the auroral zone. *Subject Headings:* **1. Magnetic disturbances 2. Suc commencements.**—*C.E.P.B.*

9K–49 550.38

Jacobs, J. A. and Obayashi, T., **The diurnal behavior of sudden commencements of magn storms at Agincourt.** *Canadian Journal of Physics*, Ottawa, 34(8):876–883, Aug. **1956.** 6 f table, 21 refs. **DWB, DLC**—The diurnal variations in the frequencies of sudden commencemen magnetic storms are examined, using the magnetograms from Agincourt for the period from to 1953 inclusive. The occurrence frequencies of sudden commencements exhibit an appa diurnal tendency which has its minimum in the morning hours and maximum in the afterno The frequency distributions for several groups classified by their amplitudes, however, show differ diurnal variations from one another. In order to confirm such local-time effects, a statistical ana of the shape of sudden commencements has been made, and each sudden commencement class according to its shape. Results show the following diurnal characteristics. A pronounced mentation of the sudden commencement impulse occurs in the afternoon hours. In the morn the initial rise of sudden commencements is usually slight and they are frequently inverted in *H*-trace, although some of them are quite clear in the *D*-trace. The local-time variation of horizontal magnetic vectors at several stages of the initial phase is also estimated statistica These results suggest that the diurnal control of the magnetic variation must be due to some a tional field produced in the earth's upper atmosphere at the time of sudden commencement, tend to modify the primary cause. (*See also* 9K–43.) *Subject Headings:* **1. Sudden commenceme 2. Diurnal geomagnetic variations.**—*Authors' abstract.*

9K–50 550.3

Just, H., **Zur Umstellung der Schätzskala der zweiten erdmagnetischen Kennziffern zum Januar 1953.** [Transformation of estimation scale of one second geomagnetic characteri numbers on Jan. 1, 1953.] *Zeitschrift für Meteorologie*, 7(3):95–96, March **1953.** 3 refs. D **DWB**—The subjective element in the estimating procedure is restricted to the solution of disturba forms and BARTELS' first characteristic numbers are used as the comparison standard so that possible to follow the behavior of the second characteristic number over a period of years. procedure is outlined briefly and the new estimation scales together with the old scale are sho The scales for elementary waves, bay disturbances, *z* disturbances and general wave lengths given. *Subject Headings:* **1. Magnetic character figures 2. Magnetic disturbances.**—*I.L.D.*

9K–51 550.385:523

Kalinowska-Widomska, Ewa (*Geophys. Observatory, Świder*), **Results of magnetic observati made during the total solar eclipse of 30. VI. 1954 at the Geophysical Observatory in Świder at the supplementary station at Ogrodniki.** *Acta Geophysica Polonica*, Warsaw, 4(2):95–111, 19 14 figs. (incl. photo), 3 tables, 5 refs. English and Polish summaries p. 107–108. **DWB, DL** A special magnetic registration station was set up in East Poland, the normal daily diurnal variat observed and then compared with the changes during the actual eclipse. Magnetograms are produced, showing a distinct disturbing influence similar to previous observations in 1912 and 1 and in agreement with the results presented by BAUER in 1902. *Subject Headings:* **1. Diur magnetic variations 2. Eclipse effects on geomagnetism 3. Ogrodniki, Poland 4. Świder, Pola** —*A.A.*

9K–52 550.385

Kato, Yoshio and Watanabe, Tomiya (*both, Geophysical Inst., Tôhoku Univ.*), **Further st on the cause of giant pulsations.** *Tôhoku Univ., Science Reports, 5th Ser., Geophysics*, 8(1):1– Nov. **1956.** fig., table, 12 refs., 18 eqs. **DWB, DLC**—Analysis shows that the periods of gi pulsations form a nearly harmonic spectrum. This fact seems to be explained fairly well by D GEY's theory, which assumes the hydromagnetic oscillation of the outer atmosphere as the ori of the geomagnetic pulsation. *Subject Headings:* **1. Geomagnetic pulsations 2. Dungey theory magnetic pulsation.**—*Authors' abstract.*

9K–53 550.385

Kato, Yoshio and Utashiro, Shinkichi, **Investigation of the sudden commencement of magnetic storm by induction magnetograph.** *Tôhoku University, Science Reports, 5th Ser.,* C

sics, 2(1):51–52, March 1950. fig. In English. *Subject Headings:* **1. Magnetic storms 2. Sud-n commencements.**

9K–54 550.385.4:523.7

Kato, Yoshio; Ossaka, Justo and Okuda, Mitsunao (*all, Geophys. Inst., Tôhoku Univ.*), **Investiga-n on the magnetic disturbance by the induction magnetograph, Pt. 3, On the magnetic storms.** *hoku Univ. Science Reports, 5th Ser., Geophysics*, 5(3):85–122, Dec. **1953.** 6 figs., 29 plates, efs. Also their **Pt. 4.** *Ibid.*, 6(3):137–149, June **1955.** 12 figs., table, 3 refs. **DWB**—Records the induction magnetograph show that at the sudden commencement of the first phase of a gnetic storm, the oscillation dH/dt has long period and large amplitude, decreasing to small values ore the beginning of the main phase. The beginning of the main phase is marked by an oscillation short period and large amplitude. The distinct types of oscillation which occur at the beginning the sudden commencement and of the main phase indicate that two kinds of radiant rays of ferent velocities enter the upper atmosphere. The authors believe that the S.C. is caused by liation of very high velocity, such as extreme ultraviolet radiation, while the main or second phase y be due to a corpuscular beam emitted by the sun. In Pt. 4, the rapid pulsations of the ter-trial magnetic field were observed simultaneously by induction magnetograph at Onagawa and emambetsu Observatories, from Sept. 18–Oct. 18, 1955. The bay disturbances experienced in s period were accompanied, as usual, by rapid pulsations at the beginning of these bay disturbances. e starting times of these oscillations, $(dH/dt)NS$ or $(dH/dt)EW$, were quite the same at both servatories and the period or phase was also quite similar at both places. But the amplitude of $/dt$ was not equal at each Observatory, that is, the amplitude of dZ/dt at Onagawa was very large mpared with that at Memambetsu. The cause of these phenomena will be discussed in the near ture. *Subject Headings:* **1. Geomagnetic disturbances 2. Magnetographs 3. Solar-magnetic lationships.**—*Authors' abstract and C.E.P.B.*

9K–55 550.385.43

Kato, Yoshio (*Tôhoku Univ.*), **On the characteristics of SC* of magnetic storm.** *Tôhoku Univ., ience Reports, 5th Ser., Geophysics*, 4(1):5–8, June **1952.** 4 figs., table, 5 refs. **DWB, DLC**—eferring to the works by Newton, Ferraro, Parkinson and Unthank and in the light of his new eory of magnetic storms, the author discusses his study of the so-called SC* (in a magnetic storm, e type of variation characterized by a small transient movement in approach direction, and im-ediately followed by the main [SC] impulse) and draws same original conclusions. World wide stribution of the SC of Aug. 3, 1949 is presented in reproduced curves from the various stations. *ubject Headings:* **1. Magnetic storms 2. Sudden commencements.**—*W.N.*

9K–56 550.385:523.78

Kato, Yoshio; Ossaka, Justo, and Sakurai, A. (*all, Geophysical Inst., Tôhoku Univ., Sendai*), **reliminary report on the effect of the solar eclipse of June 30, 1955 on the earth's magnetic field.** n: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. ondon, Pergamon, **1956.** p. 243–244. fig.) **DWB** (523.7 S684)—Changes of the earth's magnetic eld were observed at Ceylon, which was situated in the zone of totality of the eclipse and also is ear the geomagnetic equator. In addition to the conventional recording equipment, a specially esigned variometer-type magnetometer was used which recorded the changes of the magnetic eld visually on paper with a sensitivity of about 1 gamma per mm record. Definite changes were bserved which are attributed to eclipse effects: the horizontal intensity decreased at the time of aximum phase of the eclipse, the vertical intensity increased, and the declination deviated eastward r the first half of the eclipse and westward for the latter half. It is considered that these changes sult from disturbances of the electric-current system due to a decrease of the electrical conductivity a result of the eclipse. *Subject Headings:* **1. Eclipse effects on geomagnetism 2. Solar eclipse, ne 1955 3. Ceylon.**—*Authors' abstract.*

9K–57 550.385.2:523.78

Kato, Yoshio, **Report of the geophysical party of the Solar Eclipse Expedition of Tôhoku Uni-ersity on observation of terrestrial magnetic field at Nemuro, Onagawa and Katsuura.** *Tôhoku niversity, Science Reports, 5th Ser., Geophysics*, 3(2):57–72, Sept. **1951.** 9 figs., tables. **DWB**—he intensity, declination, and time variation of the earth's magnetic field were observed during e partial solar eclipse on Sept. 12, 1950. Tables of numerical values are given and results graph-ally represented. *Subject Headings:* **1. Eclipse effects on geomagnetism 2. Magnetic disturb-nces.**—*A.A.*

9K–58 550.385.37

Kato, Yoshio and Watanabe, Tomiya, **Studies on geomagnetic pulsation, Pc.** *Tôhoku Univ., cience Reports, 5th Series, Geophysics*, 8(2):111–132, Feb. **1957.** 9 figs., 5 tables, 37 refs., 39 eqs.

DWB, DLC—It is well known that the quasi-stationary pulsation of the geomagnetic field oc principally in the day time, at the time of magnetic disturbance. Geomagnetic pulsations of type are called Pc's. Observational evidences obtained show that the geomagnetic pulsation w be caused by the hydromagnetic oscillation of the earth's outer atmosphere expanding beyond ionosphere, and Pc's correspond to the poloidal type of oscillation. The radius of the outer mosphere is guessed to be of the order of several earth's radii, assuming the shape of the ou atmosphere to be spherical. It is very interesting that the dimension of the outer atmosphe of the order of that of the Chapman-Ferraro cavity or of the forbidden region. There is an obse tional fact suggesting that the outer atmosphere would be contracted at the magnetic disturba Besides, a preliminary study on the agent of excitation of the outer atmospheric oscillation pred that such oscillations would be caused by the turbulent motion of the solar corpuscular stre *Subject Heading:* **1. Geomagnetic pulsations.**—*Authors' abstract.*

9K–59 550.38

Kato, Yoshio and Watanabe, Tomiya, **Survey of observational knowledge of the geomagn pulsation.** *Tôhoku Univ., Science Reports, 5th Series, Geophysics,* 8(3):157–185, March **1957.** figs., 2 tables, bibliog. p. 181–185. **DWB, DLC**—The geomagnetic pulsation has been stu over the past half century. Observational knowledge on this problem is considerably ambi but still remains in disorder. On the other hand, the geomagnetic pulsation tends to acquire m and more important meanings in Geophysics, as shown by recent theoretical works. A spe committee of IAGA has been organized especially for investigating the rapid variation of the magnetic field and the earth current, anticipating the forthcoming geophysical year. It see therefore, to be very useful that present knowledge of geomagnetic pulsation is surveyed to things in order. *Subject Headings:* **1. Geomagnetic pulsations 2. IGY geomagnetic program** *Authors' abstract.*

9K–60 550.385:523.

Kiepenheuer, K. O., **The relations between the solar corona and geomagnetic disturban** *International Council of Scientific Unions, Brussels. Commission for the Study of Solar and T restrial Relationships, Rome, Sept.* 1952, *Procès-Verbal et Communications,* pub. **1953.** p. 17– 4 refs. **DWB**—Strong geomagnetic storms are associated with large spot groups and flares of c 3+; travelling time of corpuscles about 20 h. It is argued that this is not radiation, but that corona itself is expelled at about 1000 km/sec, by magnetic forces. There is no 27 day repetit Weak storms have a 27-day repetition; travelling time 3–5 days. These are attributed to ste emission of coronal rays representing a process of evaporation of protons. *Subject Headings:* **1. So corona 2. Magnetic disturbances.**—*C.E.P.B.*

9K–61 550.385

Kirkpatrick, C. B. (*New South Wales Univ. of Technology, Sydney, Australia*), **On curr systems proposed for S_D in the theory of magnetic storms.** *Journal of Geophysical Research,* 57 (511–526, Dec. **1952.** 6 figs., 5 refs., eqs. **DLC**—A theoretical current system, similar to the mo proposed by BIRKELAND and ALFVÉN as sources of geomagnetic disturbance, is analyzed, and magnetic field produced by it is compared with the observational data and the fields of other th retical models. The results indicate that the BIRKELAND model, which has been rejected by VEST and CHAPMAN, and ALFVÉN's model are unsatisfactory as sources of the daily variation (S_D) geomagnetic disturbance. Some general principles are developed for use in the field analysis current systems. *Subject Headings:* **1. Magnetic storm theories 2. Current systems for S_D** *Author's abstract.*

9K–62 550.385:523

Kodaikanal solar, geomagnetic and ionospheric data, July–September 1957. *Indian Jour of Meteorology and Geophysics,* 9(1):85–90, Jan. **1958.** fig., tables. **DWB, DLC**—A regular feat of the *Journal.* In addition to data on sunspot groups, solar flares, ionosphere and ozone, tables presented showing principal magnetic storms (Kodaikanal) and three-hourly indices of geomagne activity (Alibag). The former gives date of storm, storm time, sudden commencement (t amplitude), C figure degree of activity, maximal activity Greenwich day and ranges. *Subj Headings:* **1. Solar activity 2. Geomagnetic disturbances 3. Kodaikanal, India 4. Alibag, Ind** —*M.L.R.*

9K–63 550.385

Lewis, R. P. W.; McIntosh, D. H. and Watson, R. A. (*Met. Office, Edinburgh, Scotland*), **Ann variation of the magnetic elements.** *Journal of Geophysical Research,* 60(1):71–74, March **19** 3 figs., table, 4 refs. **DLC, DWB**—Annual variations of the horizontal intensity (*H* force) w computed for a number of stations, using values for magnetically quiet days where available. Th

expressed in terms of Fourier components. Differences found between one pair of stations suggest the annual variation arises from local as well as world-wide influences. *Subject Heading:* **nnual magnetic variations.**—*Authors' abstract.*

9K–64 550.385.26

Lisowski, Bolesław (*Zakład Geofizyki Pan*), **O zmianach dziennych słonecznych Sq deklinacji gnetycznej w Świdrze w dniach spokojnych.** [Solar daily variations of magnetic declination at der in quiet days.] *Acta Geophysica Polonica*, Warsaw, 4(2):112–121, **1956.** 2 figs., 5 tables, efs. English summary p. 121. **DWB, DLC**—In this paper the author publishes the results of his dies in daily solar variations S_q of the magnetic declination at Świder in quiet days in the period 1–1936. Table 2 and Fig. 1 represent hourly mean values of the daily solar variations of the lination for all the months of the year in quiet days. Table 3 and Fig. 2 give the hourly mean ues of declination for winter (SS), equinox (Equ) and summer (NS) and for the whole year (A) quiet days. Table 4 represents the annual movement of amplitude in quiet days, making comison with similar movement of amplitude in all days. Table 5 represents the moment by the al time, in which the variations are equal to zero. Corrections for noncyclic variation were not roduced. *Subject Headings:* **1. Diurnal geomagnetic variations 2. Świder, Poland.**—*Author's stract.*

9K–65 550.385.26

Maeda, Hiroshi (*Geoph. Inst., Kyoto Univ.*), **On the residual part of the geomagnetic S_q-field the middle and lower latitudes during the International Polar Year, 1932/33.** *Journal of Geogmetism and Geoelectricity*, Kyoto, 5(1/2):39–51, June **1953.** 7 figs. (1 fold.), 4 tables, 10 refs., eqs. **DLC**—A detailed spherical harmonic analysis of the S_q-field shows that this field contains t only terms depending on local time but fairly conspicuous residual terms. These residual ms seem to arise mainly from an effect of the discrepancy between the earth's magnetic and ational axes upon the dynamo-action in the S_q-layer. By coordinate transformation to make the iduals least, we get a more suitable coordinate for the S_q-field than the geomagnetic one. *Subject ading:* **1. Geomagnetic S_q-field.**—*Author's abstract.*

9K–66 550.385.26

Maeda, Hiroshi (*Geoph. Inst., Kyoto Univ.*), **An average equator for the geomagnetic S_q-field.** *urnal of Geomagnetism and Geoelectricity*, Kyoto, 5(1/2):52–57, June **1953.** 4 figs., table, 15 refs., eqs. **DLC**—In the preceding paper (*see* 9K–65), we obtained a coordinate system for the geoagnetic S_q-field. The equator of this spherical coordinate may be regarded as an average equator the S_q-field. This equator is in good agreement with a line of eastward maximum current density lculated by the dynamo-theory, taking account of the discrepancy between the geomagnetic and ographic axes and of the high electric conductivity in the equatorial zone. These results seem to ggest the fairly deep-rooted effect of the dynamo-action due to the discrepancy of above two axes on the S_q-field, on one hand, and the high electric conductivity in the equatorial zone on the other. *bject Heading:* **1. Geomagnetic S_q-field.**—*Author's abstract.*

9K–67 551.510.535:550.385.4

†Matsushita, Sadami (*Geoph. Inst., Kyoto Univ.*), **Variations at moderate latitudes and the uatorial zone and the current system for the S_D field (Ionospheric variations associated with omagnetic disturbances, Pt. 1).** *Journal of Geomagnetism and Geoelectricity*, Kyoto, 5(4):109–135, ec. **1953.** 18 figs., 4 tables, 34 refs., 9 eqs. **DLC**—Variations in the densities and heights of the nospheric *Es* and *F2* regions during magnetic storms are studied. At the moderate latitudes in *mmer* solstice and at the equatorial zone, the disturbance variation of the *Es* in both local time $_D$) and storm time (*Dst*) is obtained by statistical examination, although the individual values the *Es* data may not always be accurate. The amplitude of the S_D variation of the *Es* at the derate latitudes is about 0.5 Mc/s in frequency (15% for mean ionized density), and the phase the variation seems to be *opposite* to that of the *F2*. At the equatorial zone, the S_D variations the *Es* and *F2* regions and the *Dst* variation for *foF2* are rather peculiar for the phase, compared th those at the moderate latitudes. The geomagnetic S_D variation at this zone is also a little ferent from that in the moderate latitudes. On the other hand, the current system for the S_D ld is calculated by the dynamo theory, taking into consideration the anisotropic electrical-conctivity. A production mechanism of the *Es* is supposed, and the possibility that the ionospheric variations are due to the effect of a drift by the earth's magnetic field and the electric field of the current is discussed. *Subject Headings:* **1. Magnetic storms 2. Dynamo theory of ionosphere.** *Author's abstract.*

9K–68 550.385.36

Meyer, Otto, **Über eine besondere Art von erdmagnetischen Bay-Störungen.** [Special type geomagnetic bay-disturbance.] *Deutsche Hydrographische Zeitschrift*, 4(1/2):61–65, **1951.**

8 figs., 9 refs. German, English and French summaries p. 61–62. **DLC**—Bay-type disturba with pulsations recorded at Wingst attributed to corpuscular streams are illustrated and seasonal and diurnal frequency tabulated as a whole and according to sign of first kick. Fro comparison with NIEMEGK some conclusions about ionosphere currents are drawn. *Subject Head* **1. Bay disturbances 2. Geomagnetic pulsations.**—*C.E.P.B.*

9K–69 550.38

Mikhalkov, V. N., **K voprosu o strukture solnechnosutochnykh variatsii geomagnitnogo p** [Problem of the structure of the solar diurnal variations of the geomagnetic field.] (In: Akade Nauk Uzbekskoĭ SSR. Institut Matematiki i Mekhaniki, **Meteorologiia i gidrologiia v Uzbekist** Tashkent, **1955.** p. 277–280. fig., 4 refs.) **DLC**—Solar diurnal geomagnetic variations are cl fied into quiet and disturbed. Disturbed daily variations are the algebraic sum of disturbed quiet variations. The results of studies on the origin of daily solar variations, their structure, a method of analyzing solar daily magnetic variations according to their constituents is presen Diurnal geomagnetic variations resulting from wave radiation, especially the ultraviolet part of solar radiation, are homogeneous, changing only seasonally; their amplitude depending upon latit Corpuscular radiation is not constant so that density of the radiation enveloping the earth is homogeneous. The "quiet daily solar variations" represent more complex geomagnetic fie than is usually assumed. When active zones exist on the sun, the ejected corpuscular streams diffe density from the general corpuscular background so that irregular variations occur when the e falls into them. Irregular variations in the case of low intensity may diminish the amplitude of daily variation and may move extreme points. The mean daily variation in which irregular va tions are smoothed and can be represented by the sum of their four harmonics and the relationshi the individual harmonics or their combinations to the variations are discussed. *Subject Head* **1. Diurnal geomagnetic variations 2. Corpuscular radiation.**—*I.L.D.*

9K–70 550.385.4:52

Moriyama, Fumio (*Tokyo Astron. Obs.*), **On sunspots and magnetic storms.** *Japan. Sci Council. Ionospheric Research Committee, Report of Ionosphere in Japan,* 5(4):151–157, 1 2 tables, 4 figs., 2 refs. **DWB**—A statistical analysis about the effect of central meridian pass of active sunspots upon the occurrence of magnetic storms, considering the magnetic characte the spot. It is found that magnetic storms occur about one day after an active sunspot passed meridian. *Subject Headings:* **1. Sunspot effects 2. Magnetic storms.**—*A.A.*

9K–71 550.385.4:52

Nagata, Takesi, **Characteristics of the solar flare effect (*Sqa*) on geomagnetic field at Huanc (Peru) and Kakioka (Japan).** *Journal of Geophysical Research,* 57(1):1–14, March **1952.** 7 fi 2 tables, 13 refs. **DLC**—The characteristics of solar flare type (*s.f.*) variations of the geomagn field at Huancayo, Kakioka, and Watheroo are statistically examined. The main indicators of t characteristics are the time from beginning of a *s.f.* variation to its maximum deviation (T_1), and ratio of its maximum deviation to the range of daily variation at the corresponding time ($\Delta H/R$ With respect to both quantities, the data of the three stations show nearly the same values. magnitude of the *s.f.* variations at Huancayo is abnormally large, but T_1 and $\Delta H/Rh$ show nor values. Assuming that the *s.f.* variation has an abrupt increase, the integrated electrical cond tivity of the ionosphere is estimated with the aid of a theoretical calculation of transient dyna action. The result shows that the integrated conductivity of the ionosphere amounts to 6×1 $\sim7\times10^{-8}$ emu. over those three places. *Subject Headings:* **1. Solar flare effects 2. Magnetic sto 3. Huancayo, Peru 4. Kakioka, Japan.**—*Author's abstract.*

9K–72 550.385

Nagata, T. and Abe, S. (*both, Geoph. Inst., Tokyo Univ.*), **Notes on the distribution of S in high latitudes.** *Japan. Science Council. Ionospheric Research Committee, Report of Ionosph in Japan,* 9(1):39–44, 4 figs., 7 refs. **1955.** Also reprinted as *Tokyo. Univ. Geophysical Instit Geophysical Notes,* 8(1), *Contribution* No. 4, June **1955.**—Distribution of the preliminary reve impulse of SC* of magnetic storms in the Northern Hemisphere is examined. The result sh that the equivalent overhead currents for preliminary reverse impulse are represented by curr flows from 10 h to 22 h in the Polar Cap, and the resulting two vortices extending to lower latitude a clockwise vortex in the afternoon and a weaker counter-clockwise one in the forenoon. *Sub Heading:* **1. Sudden commencements.**—*Authors' abstract.*

9K–73 550.385

Nagata, Takesi, **Sudden commencements preceded by the preliminary reverse impulse i geomagnetic field.** *Nature,* London, 169(4298):446–447, March 15, **1952.** 2 figs., 5 refs. **DW** The ratio of preliminary reverse to main impulse is plotted and found to depend on local time (m

ut 16 h) and geomagnetic latitude. The equivalent overhead current arrows are plotted for ril 30, 1933, with a similar result. *Subject Headings:* **1. Magnetic disturbances 2. Sudden mencements.**—*C.E.P.B.*

9K–74 550.385.4:523.743

Newton, H. W., **A simple numerical illustration of the statistical relationship between great magnetic storms and the larger sunspots.** *International Council of Scientific Unions, Brussels, mmission for the Study of Solar and Terrestrial Relationships, Rome, Sept. 1952, Procès-Verbal et mmunications*, pub. **1953.** p. 21–22. foot-refs. **DWB**—Table gives area range of sunspots (by ps of 250 millionths of sun's hemisphere), number of geomagnetic storms and ratio to percentage tribution of all spot areas. It shows rapid increase of this ratio between smaller and larger spots. *bject Headings:* **1. Magnetic storms 2. Sunspot effects.**—*C.E.P.B.*

9K–75 550.385.28

Nicholson, Seth B. and Wulf, Oliver R., **Diurnal variation of irregular geomagnetic fluctuations.** *urnal of Geophysical Research*, Wash., D. C., 60(4):389–394, Dec. **1955.** 4 figs., 12 refs. **DLC**—e authors have studied the diurnal variation of irregular geomagnetic fluctuations in moderately v latitudes using the eight daily *K* numbers (three-hour-range indices) for the seven years 1940–46 and for the six observatories: Alibag, Watheroo, Honolulu, Tucson, San Juan, and San Fer- ndo. These observatories were chosen because they are fairly uniformly distributed in longitude, ing at 73°, 116°, 202°, 249°, 294°, and 354°E., respectively. A local time variation, to be expected m the work of earlier investigators, is apparent also in these data. The present data indicate a inimum near sunrise and a maximum in the late evening. This diurnal variation appears to have small seasonal change. When the local time variation is deducted from the original data for each servatory, the remainders suggest a universal time variation which exhibits a pronounced seasonal ange. A hypothesis is developed to explain the nocturnal prevalence of the irregular fluctuations terms of atmospheric turbulence in the ionosphere. The turbulent motions are regarded as ndered during the day by electromagnetic damping. It is suggested that features of the large- ale circulation of the atmosphere may contribute to the universal time component. *Subject eadings:* **1. Diurnal geomagnetic variations 2. Universal time components.**—*Authors' abstract.*

9K–76 550.385.37

Obayashi, T. and Jacobs, J. A., **Geomagnetic pulsations and the earth's outer atmosphere.** *eophysical Journal*, London, 1(1):53–63, March **1958.** 6 figs., 16 refs., 12 eqs. **DWB, DLC.** Also sued as: Toronto. Univ. Dept. of Physics, Contract AF 19(604)-2147, Scientific Report, No. 5, ug. 19, **1957.** 13 p. 6 figs., table, 16 refs., 13 eqs. **DWB** (538.7 T686sc)—Hydromagnetic scillations of the earth's ionized outer atmosphere along the geomagnetic lines of force are con- dered. The observational evidence of world-wide geomagnetic pulsations yields the distribution f ionic density in the outer atmosphere extending beyond the ionosphere. It is found that the ion ensity is about 10^3 per cm^3 at a distance of a few earth radii decreasing exponentially to a value f the order of 3 to 5 per cm^3 in interplanetary space. A theoretical consideration on the tem- erature of the outer ionosphere is also discussed. *Subject Heading:* **1. Geomagnetic pulsations.**— *uthors' abstract.*

9K–77 523.78:550.385

Ota, Masaziro (*Magnetic Obs., Kyoto Univ.*), **An example of the distorted geomagnetic field uring the solar eclipse of June 20, 1955.** *Japan. Science Council. Ionosphere Research Com- ittee, Report of Ionosphere Research in Japan*, 10(1):15–16, **1956.** 2 figs. **DWB**—*Subject Heading:* **Eclipse effects on geomagnetism.**—*M.R.*

9K–78 550.385.4

Ota, Masaziro (*Aso Magn. Obs., Kyoto Univ.*), **The recurrence-tendency of magnetic storms.** *apan. Science Council. Ionosphere Research Committee, Report of Ionosphere Research in Japan*, (4):212–214, Dec. **1952.** table, fig. **DWB**—196 magnetic storms recorded during one year at so Magnet. Obs. (Sept. 1949–Aug. 1952) are arranged in time series according to the date of their ommencement. A 27-day periodicity is found in several instances. *Subject Headings:* **1. Magnetic torms 2. Periodicities.**—*G.T.*

9K–79 550.385.27

Pontier, L., **Amplitude de la variation diurne de *H* au voisinage de l'équateur magnétique au ogo.** [The amplitude of daily variations of *H* in the vicinity of the magnetic equator in Togo.] *nnales de Géophysique*, 6(4):238–241, Oct.–Dec. **1950.** 2 figs., 2 tables, 3 refs. **DLC**—In order investigate the relationship between latitude and the variations of amplitude of the daily variations

of *H*, the influence of variations due to the solar cycle and the solar declination have been elimina
A table giving observed and corrected amplitudes determined at irregular intervals from June
to Feb. 1950 is presented. The results obtained indicate that the amplitude of the daily variati
increases as the inclination decreases and has a maximum at the magnetic equator. *Subject Head*
1. Diurnal magnetic variations 2. Magnetic equator.—*I.L.D.*

9K–80 550

*Pramanik, S. K. and Narayanan, S. Yegna (*Met. Office, Poona*), **Diurnal magnetic variatio
equatorial regions.** *Indian Journal of Meteorology and Geophysics*, 3(3):212–216, July **1952.**
4 tables, 7 refs. **DWB**—Mean hourly values of *H* and *Z* presented for all days, as well as for q
and slightly disturbed days (three stations in India). Large diurnal range of *H* was found. *Su*
Headings: **1. Diurnal magnetic variations 2. Equatorial regions 3. India.**—*A.A.*

9K–81 550

*Pramanik, S. K. and Hariharn, P. S. (*Met. Office, Poona*), **Diurnal magnetic variations near
magnetic equator.** *Indian Journal of Meteorology and Geophysics*, 4(4):353–358, Oct. **1953.** 3 fi
2 tables, 12 refs. **DWB, DLC**—Maximum diurnal range in the horizontal component *H* oc
near the magnetic equator, and in a narrow belt of 5°–6° lat. It is about twice as high in this re
as outside it and increases rapidly on approaching the magnetic equator. The decrease is about
same to the N. and S. of the magnetic equator in India and South America. Data for a whole se
of stations in S. India (6°N.–16°N.) are presented and analyzed (1950–1953). It should be no
that the magnetic equator is far from geographical equator in both places. *Subject Headi*
**1. Diurnal magnetic variations 2. Geomagnetic data 3. Magnetic equator 4. India 5. So
America.**—*M.R.*

9K–82 550

Rikitake, Tsuneji and Yokoyama, Izumi (*both, Earthquake Res. Inst., Tokyo Univ.*), **Anomal
relations between *H* and *Z* components of transient geomagnetic variations.** *Journal of*
magnetism and Geoelectricity, Kyoto, 5(3):59–65, Nov. **1953.** 11 figs., 8 refs. **DLC**—This is
summarize the writers' studies on the anomalous behavior of geomagnetic variations in Japan wh
were published in a series of papers in the **Bulletin of the Earthquake Research Institute.**
anomalously large amplitude of the vertical component of geomagnetic variations is pointed ou
Hermanus, S.A., and some observatories in Japan. The distribution, especially in Japan, is
tistically examined. The anomaly is found in a limited area in the central part of Japan.
results of the analysis based on the potential theory show that the anomaly is caused by the magn
field originating in the earth. The anomaly is well approximated by an apparent magnetic di
situated under central Japan. But it still remains unknown why such a localized anomaly oc
on occasions of geomagnetic variation. *Subject Headings:* **1. Geomagnetic variations 2. G
magnetic anomalies 3. Japan.**—*Authors' abstract.*

9K–83 550.385.26:523

Schneider, Otto, **Acerca de la variación geomagnética de días tranquilos en Pilar.** [G
magnetic variation of quiet days at Pilar.] *Meteoros*, Buenos Aires, 2(3/4):149–165, July/Dec. 19
5 figs., 8 tables, 5 refs. English summary p. 140. **DWB**—A graphic and tabular synthesis
principal characteristics of *Sq* variations on internationally "quiet" days with the horizontal g
magnetic component registered at Pilar Observatory. The harmonic coefficients of the mont
means of *Sq* are calculated and presented to the 4th order, for 264 single months of the two compl
sunspot cycles from 1927–1948. The relation of the amplitude to sunspot activity was investigat
and it is shown that the specific variability ρ of *Sq* relative to relative sunspot number has a typ
annual variation with summer maximum. A linear correction was applied to reduce the harmo
amplitude to *O* solar activity. Thus reduced, the annual course is typical of an intertropical
servatory. *Subject Headings:* **1. Diurnal geomagnetic variations 2. Solar influences 3. Terrest
magnetism.**—*Trans. from author's abstract, M.R.*

9K–84 550.385.4:550.38

Schneider, Otto and Saluzzi, María Elena, **Effecto de curvatura en la perturbación residual
geomagnetísmo.** [Effects of curvature on the residual perturbation of geomagnetism.] *Meteo*
Buenos Aires, 1(2/3):125–133, June **1951.** 4 figs., 5 tables, 4 refs., 5 eqs. Spanish and Engl
summaries p. 125. **DWB**—Records for New Years Island and Pilar Observatory are analyzed
determine the effect of intense magnetic storms on the daily variation of the horizontal compon
of the earth's magnetic field during the period of recovery just after the storm. This effect alt
the character of the solar and lunar daily curve, and corrections should be made therefore. *Sub*
Headings: **1. Magnetic storms 2. Diurnal magnetic variations 3. Geomagnetic field variatio
4. New Years Island, Argentina 5. Pilar Observatory, Argentina.**—*M.R.*

9K–85 550.385.37

Schneider, Otto, **Vorschläge zur statistischen Erfassung erdmagnetischer Mikropulsationen.** [Proposals for a statistical survey of terrestrial magnetic micropulsations.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:403–412, **1951.** 3 figs., 9 refs. German, Russian, English and French summaries p. 403–404. **DWB**—A classification of micropulsations is proposed, depending on magnitude, regularity and duration, and is applied to records for South Orkneys and to various magnetic disturbances. *Subject Heading:* **1. Magnetic micropulsations.** *C.E.P.B.*

9K–86 550.385.1:551.521.64:523.746

Sekido, Yataro (*Nagoya Univ.*); Wada, Masami; Kondoh, Ichiro (*both, Scientific Res. Inst.*) and Iwabata, Kin-Aki (*Tokyo, Univ.*), **Correlation among magnetic storms, solar phenomena and cosmic ray storms.** *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere Research in Japan*, 9(3):174–180, Sept. **1955.** 4 figs., 16 refs. Also: Sekido, Yataro, **Two types of the geomagnetic disturbance.** *Ibid.*, p. 182. **DLC, DWB**—Magnetic storms are classified into *S* or *M*-type storms according to whether or not they accompany a decrease in cosmic ray intensity. The correlation between the occurrences of the magnetic storms and the central meridian passages of the large sunspot groups is good for the magnetic storms of type *S*. The correlation vanishes for the storms of type *M*. Like the relative sunspot numbers, the frequency of occurrence of *S*-type storms shows a pronounced 11-yr cycle variation, while that of the *M*-type storms does not show such variation. The 27-day recurrence tendency of geomagnetic activity is analyzed by the superposed-epoch method, where the magnetic storms of type *S* and *M* are selected as zero days. The curve around the *M*-type storms consists of rather sharp peaks in several cycles with flat portions in between, which is similar to a curve obtained by CHREE, whereas the curve for *S*-type storms shows almost sinusoidal variation. It may be concluded that *S*-type storms are caused by the corpuscular clouds which are ejected from sunspot groups, and the *M*-type storms are caused by the corpuscular stream from the so-called *M*-regions. *Subject Headings:* **1. Magnetic storms 2. Cosmic ray variations 3. Sunspot effects.**—*Authors' abstract.*

9K–87 550.385:550.388

Selzer, E. (*Paris*), **Manifestations semi-locales, instables, du magnétisme terrestre.** [Semilocal transitory effects of terrestrial magnetism.] *Annales de Géophysique*, 8(3):275–285, **1952.** 3 figs., 16 refs. French and English summaries p. 275. **DLC**—The magnetic storm which started Sept. 30, 1950 and lasted till about Oct. 7th, presented during successive days some individual disturbances, having the shape of sharp, big oscillations, which had not been clearly observed before. This kind of disturbance which appeared with very characteristic features on the magnetograms of Western European observatories, on the 3rd and 4th of Oct., has also shown up with the same distinctive features on the magnetograms of various American observatories, but on the 1st and 2nd of Oct. The author tries to define these features and the semilocal factors which seem to control the phenomenon. He suggests possible relations with similar semilocal features of a certain kind of ionospheric storminess. *Subject Heading:* **1. Magnetic storms.**—*Author's abstract.*

9K–88 550.385:523.75

Sipahioglu, Osman, **Sur l'intervalle de temps entre les éruptions chromosphériques et les perturbations géomagnétiques.** [Time lag between chromospheric eruptions and geomagnetic disturbances.] *Académie des Sciences, Paris, Comptes Rendus*, 243(19):1427–1430, Nov. 5, **1956.** 2 tables, 9 foot-refs., eqs. **DLC**—The statistical relationship between solar flares and geomagnetic phenomena is analyzed by considering separately the solar flare effects on S.S.C. (Storm sudden commencements) and on S.I. (Sudden impulses). In the case of S.S.C., no solar flare effect can be discerned, but a definite accumulation of S.I. appears 25 to 30 hrs after solar flares. *Subject Headings:* **1. Geomagnetic variations 2. Solar flare effects on geomagnetism.**—*G.T.*

9K–89 550.384:551.510.535

Sivaramakrishnan, M. V. (*Met. Office, Poona*), **A comparative study of geomagnetic and ionospheric changes at Kodaikanal and Huancayo.** *Indian Journal of Meteorology and Geophysics*, Delhi,, 7(2):137–146, April **1956.** 8 figs., 3 tables, 17 refs. **DWB, DLC**—A study of geomagnetic field variations for five years, 1949 to 1953, and ionospheric changes during 1952–1954 at Kodaikanal reveals that Kodaikanal, situated near the geomagnetic equator, shows more or less the same anomalous behavior as Huancayo. The study shows: (*i*) Abnormal large range in the horizontal intensity during quiet days, (*ii*) No abnormality in *H* during geomagnetic disturbances, (*iii*) Amplitudes of S.C.'s during noon are greater near the geomagnetic equator than at stations further away from it, (*iv*) A midday decrease of foF2 on quiet days (the bite-out effect), (*v*) Increase in the electron density of F2 layer with increase in geomagnetic activity conducive to better conditions for radio propagation, and (*vi*) Occurrence of the lunar stratification of the F2 layer and its disappearance at the lunar

times 0700 and 1930 h. *Subject Headings:* **1. Geomagnetic variations 2. Geomagnetic effect ionosphere 3. Kodaikanal, India 4. Huancayo, Peru.**—*Author's abstract.*

9K–90 550.385.43:52

Sivaramakrishnan, M. V., **Geomagnetic field variations at Kodaikanal.** *Nature*, 169(42 409–410, March 8, **1952.** fig., 6 refs. **DWB**—A note on observations of sudden commencements on unusual geomagnetic effects during solar flares. *Subject Headings:* **1. Sudden commencem 2. Solar flare effects on geomagnetism 3. Kodaikanal, India.**—*C.E.P.B.*

9K–91 550.385(548):52

*Sivaramakrishnan, M. V. (*Solar Phys. Obs., Kodaikanal*), **Recurrence feature of some of great magnetic storms recorded at Kodaikanal, 1949–1951.** *Indian Journal of Meteorology Geophysics*, 3(3):231–235, July **1952.** 3 figs., table, 2 refs. **DWB**—Great magnetic storm of J 19–20, 1950 with a recurrence after 27 days is discussed in some detail. *Subject Headings:* **1. M netic storms 2. Solar activity 3. Kodaikanal, India.**—*A.A.*

9K–92 550.384:523

Sucksdorff, E. (*Finnish Met. Office, Helsinki*), **Influence of the moon and the inner planets the geomagnetic activity.** *Geophysica*, Helsinki, 5(2):95–106, **1956.** 6 tables, 8 refs. **DL** The geomagnetic activity in Sodankylä during the 30 yrs (1914–1944) shows a fairly system double-wave variation in a period corresponding to the synodic revolution of the moon, the c minimum of activity occurring during the new moon. A decrease in activity also appears at times of the inferior conjunctions of Mercury and Venus, suggesting that all of these planets surrounded by a magnetic field. *Subject Headings:* **1. Planetary influences 2. Lunar influe 3. Geomagnetic activity 4. Sodankylä, Finland.**—*Author's abstract.*

9K–93 550.38

†*Sugiura, Masahisa, **Study on the morphology of magnetic storms.** Alaska. Univ. Geophys Institute, Contract AF 19(604)-1048, Scientific Report, No. 1, March 1, 1954–March 31, 19 118 p. 11 figs., tables, 41 refs. **DWB**—A study of 346 magnetic storms having sudden comme ments during period 1902–1945, classified into 3 groups: 1) weak, 2) active, and 3) great sto (136, 136 and 47 storms, respectively). Only the 136 weak storms are analyzed in this rep Data for 25 magnetic observatories in all parts of the world were used (12° to 48°S. and 20° to 80° (For Reports 2 and 3 and Final Report, *see* 9K–18, –19 and –94.) *Subject Headings:* **1. Magn storms 2. Sudden commencements.**—*M.R.*

9K–94 550.385

Sugiura, Masahisa and Chapman, Sydney (*both, Geophys. Inst., Univ. of Alaska*), **A study of morphology of magnetic storms.** Alaska. University. Geophysical Institute, Contract 19(604)-1048, Final Report, July **1956.** 126 p. 24 figs., 9 tables, 32 refs. **DWB(?)**—An extens study of 346 sudden commencement magnetic storms during 1902–1945, classified into weak (13 moderate (136) and great (74) storms has been carried on under this contract. The present rep goes into all phases of the 136 weak storms, with data from 26 observatories in various parts of world used in the analysis. Grouped into 10 geomagnetic latitude categories, the variations w found to be abnormal at Huancayo. (For Reports 1–3, *see* 9K–18, –19 and –93.) *Subject Headin* **1. Magnetic storm variations 2. Sudden commencements 3. Huancayo, Peru.**—*M.R.*

9K–95 550.385.24:523

Tandon, J. N. (*Physics Dept. Delhi Univ.*), **A note on the annual variation of geomagne activity and *M*-regions.** *Journal of Geophysical Research*, Wash., D. C., 61(2, Pt. 1):211–213, Ju **1956.** table, 6 refs. **DLC**—Results of an investigation are given, associating recurrent 27-d geomagnetic activity with *M*-regions of the sun, around years of sunspot minima. The associat of *M*-sequences with various solar features of the disk and corona is also indicated. *Subject Headin* **1. Annual magnetic variations 2. Solar activity.**—*Author's abstract.*

9K–96 550.385:550

Tikhonov, A. N. and Lipskaia, N. V., **O variatsiiakh zemnogo elektricheskogo polia.** [Var tions of the earth electric field.] *Akademiia Nauk SSSR, Doklady*, 87(4):547–550, **1952.** 2 tabl refs., 6 eqs. **DLC**—Deals with the diurnal variation of the natural electromagnetic fields of t earth. Theoretical approach: Maxwell equations for a flat earth. Compares the computed lin velocity of earth's rotation with observed values. *Subject Headings:* **1. Earth's magnetic fi 2. Diurnal magnetic variations.**—*A.A.*

9K–97 550.385

Troitskaia, V. A., **Dva kolebatel'nykh rezhima electromagnitnogo polia zemli i ikh sutochn khod po mirovomu vremeni.** [Two fluctuating regimes of the electromagnetic field of the ear

...l their daily cycle according to G.M.T.] *Akademiia Nauk SSSR, Doklady*, 93(2):261–264, ... v. 11, 1953. 3 figs., 6 refs. **DLC**—Results of a study of short-period fluctuations of the earth's ...ctric field based on recordings of earth currents. The author shows that during the 24 hrs of the ...y two essentially distinct regimes of fluctuation occur. One regime, characterized by individual ...illation, draws on the background of a smooth recording, while the other is distinguished by ...arly uninterrupted oscillations which often continue for several hours. The day (24 hrs) is ...ided into 2 periods (approximately 12 hrs each) during which one or the other regime prevails. ...e shift of regimes proceeds regularly, day by day, at one moment, between long. 34° to 142°E. ...d lat. 39° to 73°N. Uninterrupted oscillations Type I occur between 0 and noon G.M.T. (usually ...tween 2 and 4 a.m.); Type II oscillations take place between noon and 12 p.m. G.M.T. (mostly ...out 7–8 p.m.). The distribution of the onset of these oscillations (apparently over the whole ...be), their regularity and the change of oscillating regimes, as well as the location of the maximum ... the curves of distribution according to hours of the day, prove that conditions of stimulation of ...e or another regime of the earth's electric field is determined by the orientation of the magnetic ...is of the earth relative to the sun. *Subject Heading:* **1. Diurnal magnetic variations.**—*A.M.P.*

9K–98 550.385.4:523.75

... van Saaben, D., **Solar-flare effects and magnetic storms.** *Journal of Atmospheric and Terstrial Physics*, 3(5):270–273, June **1953.** fig., 4 tables, 2 refs. **DLC**—Solar flares are sometimes ...companied by a geomagnetic disturbance, the solar-flare effect (SFE). In 1949–50–51, neglecting ...current storms, the probability of a magnetic disturbance with sum of magnetic activity indices of ...) or more was no higher after a SFE than after an arbitrary instant, but there was a slightly in...eased probability of a *severe* magnetic storm. *Subject Headings:* **1. Solar flares 2. Magnetic ...orms.**—*C.E.P.B.*

9K–99 550.385.41

Vestine, E. H. (*Dept. of Terrestrial Magnetism, Carnegie Inst. of Wash., Wash., D. C.*), **The ...mediate source of the field of magnetic storms.** *Journal of Geophysical Research*, 58(4):560–562, ...ec. **1953.** 2 figs. **DLC**—Evidence is presented to support contention that the major immediate ...urce of the electric field in all phases of a magnetic storm is within the earth's atmosphere and not ... solar currents, although, without doubt, these latter contribute to the changes through intermediate ...rocesses (such as, perhaps, ring currents in the ionosphere). *Subject Heading:* **1. Magnetic storm ...heories.**—*M.R.*

9K–100 550.385.4:551.594.13:551.55

Vestine, E. H. (*Dept. of Terrestrial Magnetism, Carnegie Inst. of Wash., Wash., D. C.*), **Note on ...eomagnetic disturbance as an atmospheric phenomenon.** *Journal of Geophysical Research*, 58(4): ...39–541, Dec. **1953.** 6 refs. **DLC**—Recent studies indicate that magnetic storm currents, even ...cluding SC's and the initial phase, are in the atmosphere immediately overhead. The possible ...elationships of these currents to wind motions are briefly discussed. *Subject Headings:* **1. Magnetic ...torms 2. Atmospheric electric currents.**—*Author's abstract.*

9K–101 550.385.26:523.78

Volland, H., **Zur Theorie des Sonnenfinsternis-Effektes im Erdmagnetfeld.** [Theory of solar ...clipse effect in the geomagnetic field.] *Journal of Atmospheric and Terrestrial Physics*, 9(2/3):131–...43, Aug./Sept. **1956.** 6 figs., table, 9 refs., 18 eqs. English summary p. 131. **DWB**—The de...rmation of the S_q current during a solar eclipse is represented by a current function S_e, which is ...uperposed on the S_q system and moves with the eclipse. The magnetic field components of S_e are ...omputed, and the influence of the part induced in the earth's crust is discussed. *Subject Headings:* ... **Geomagnetic disturbances 2. Eclipse effects on geomagnetism.**—*Author's abstract.*

9K–102 550.385.26

Wiese, Horst, **Der tagesperiodische Teil der erdmagnetischen Störungen.** [The daily periodic ...art of geomagnetic disturbances.] *Beiträge zur Geophysik*, 63(4):282–301, **1954.** 6 figs., 2 tables, ...0 refs. **DLC**—The 36-year mean daily variation of disturbance S_D at Niemegk on days selected ...r nearly uniform disturbance was found. Its form and amplitude do not depend on UV radiation ...r sunspot number but show great seasonal differences. North-south displacements of the centers ...f the extrapolar current whirls of S_D occur in the course of the year. Causes of the disturbances ...re discussed. *Subject Headings:* **1. Magnetic disturbances 2. Niemegk, Germany.**—*C.E.P.B.*

9K–103 550.385.26:523.746

Wiese, Horst, **Der tägliche Gang der erdmagnetischen Komponenten an ausgewählt ruhigen ...agen in Potsdam-Niemegk.** [The daily variation of the geomagnetic components on selected ...uiet days at Potsdam.] *Beiträge zur Geophysik*, 63(4):302–317, 1954. 5 figs., table, 21 refs. **...LC**—The geomagnetic diurnal variation at Niemegk on selected quiet days is set out and variation

of N., E. and vertical components shown with different sunspot relative numbers in each mo
The increase in daily variation begins at quite small sunspot numbers, especially in summer.
annual variation shows anomalies which are related to changes in the general circulation in the
atmosphere, shown by mean direction of motion of ionization clouds. *Subject Headings:* **1. Diu
magnetic variations 2. Sunspot effects 3. Niemegk, Germany.**—*C.E.P.B.*

SUPPLEMENTARY MATERIAL

9K–104 550.38

Duffus, H. J. and Shand, J. A., **Some observations of geomagnetic micropulsations.** *Canad
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graphical distribution of geomagnetic micropulsations (Pc and Pt). It is argued from a compari
of published data that these phenomena have primarily a solar time dependence, and may oc
locally. At our two stations, separated by 60 longitude degrees, related signals are only occasion
observed. The phase characteristics of such related signals together with differences in directi
characteristics reported by other observatories, put serious strain on recent theories of the ou
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14 figs., table, 35 refs. **DLC**—A statistical investigation of the world-wide electric current syste
corresponding to sc's has been carried out. The storm-time variation Dst and the disturban
diurnal variation Ds of sc's are derived separately from the results of the average local-time variatio
in the magnetic field at different latitudes. A conspicuous Ds current system is found in the inn
polar regions and a concentrated current flow is also confirmed along the geomagnetic equat
resembling the current system of an enhanced Sq field. The inner polar region currents flow towa
the meridian at about 9 h local time and are supposed to complete their path along the outer auro
zone in opposite directions in the forenoon and afternoon hemispheres. It is of interest that t
pattern of this atmospheric electric current system is very similar to that caused by an electr
doublet centered on the highly conducting region near the pole. Some observed facts concerni
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sudden commencements that occurred during the interval 1902–1945. The average storm fie
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of longitude λ, relative to the sun, and into DS, that depends on λ. Part DS is expressed in terms
harmonic components with respect to λ, and like Dst, the amplitudes and phases of these com
nents, are functions of st and of geomagnetic latitude. They are determined, for each of the thr
magnetic elements, declination, horizontal force, and vertical force, at eight geomagnetic latitud
ranging from 80°N to 1°S. In the first, the main harmonic component of DS, its variations wi
respect to storm time differs notably from that of Dst: its maximum is attained earlier and its dec
is more rapid. The storm-time changes of the smaller harmonic components of DS have been le
fully determined. The average characteristics of moderate storms are compared with those of wea
storms. *Subject Headings:* **1. Magnetic storm variations 2. Sudden commencements.**—*Auth
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PART III. REVIEWS, TRANSLATIONS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

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results of a continent-wide precipitation chemistry program for the analyses of NO_3- –
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s"ezd,** (Third All-Union Hydrological Conference), p. 3–9
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